COMMONWEALTH MYCOLOGICAL INSTITUTE
18 JAN 1965

LIT. & PHIL. SOC. NEWCASTLE

The

British Mycological Society.

(Recognosce notum, ignotum inspice.)

Established 1896.

TRANSACTIONS

1902-1906.

Vol. II.

Edited by Carleton Rea.

800.
In Prat.
mo9

LIST OF FOUNDATION MEMBERS, 1902.

1. Acland, Sir Charles Thomas Dyke, Holnicote, Taunton, Somerset.
2. Allen, Mr. W. B., Benthall, Broseley, Salop.
3. Balfour, Professor Isaac Bayley, M.A., M.D., F.R.S., Inverleith House, Edinburgh.
4. Barrington, Mr. F. J. F., Chapel Street, King's Lynn.
5. Biffen, Mr. R. H., M.A., 6, Claremont, Cambridge.
6. Bird, Mr. C. P., I.C.S. retired, J.P., F.R.H.S., Drybridge, Hereford.
7. Birks, Mr. Thomas, Southdene, Eaglescliffe, R.S.O.
8. Blackman, Mr. V. H., British Museum (Natural History), Cromwell Road, London, S.W.
9. Boston, The Mycological Club, Boston, Mass., U.S.A.
10. Burrell, Mr. W. H., Sheringham, Norfolk.
11. Carr, Professor J. W., M.A., University College, Nottingham.
12. Carruthers, Mr. J. B., B.A., Government Mycologist and Assistant Director, Royal Botanic Gardens, Peradeniya, Ceylon.
13. Clarke, Rev. F. K., M.A., Orcheston, Malvern Wells.
14. Cooke, Dr. M. C., 53, Castle Road, Kentish Town, London, N.W.
15. Cotton, Mr. Arthur D., F.L.S., 33, Lowndes Street, London, S.W.
16. Crawford Mr. W. C., M.A., F.R.S.E., 1, Lockharton Gardens, Edinburgh.
17. Crossland, Mr. Charles, F.L.S., 4, Coleridge Street, Halifax.
18. Edwards, Mr. W. H., Curator, Hastings Museum, Victoria Institute, Worcester.
19. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
20. Farmer, Professor J. Brentland, M.A., F.R.S., Botany Laboratory, Normal School, S. Kensington, S.W.
21. Fitz-Gerald, Rev. H. P., F.L.S., Barracane, Wellington College, Berks.
22. Fowler, Rev. W., M.A., Liversedge Vicarage, Narmanton.
23. Gardner, Mr. Frederic, 11, Nevill Street, Abergavenny
24. Gelsthorp, Mr. Thomas, Eastgate, Louth.
25. Gibbs, Mr. Thomas, 43, St. Ronan's Road, Sheffield.
26. Goodwin, Mr. D. P., Oakden, Kidderminster.

27. Green, Mr. C. Theodore Green, M.R.C.S. England, L.R.C.P. London, F.L.S., 31, Shrewsbury Road, Birkenhead.
28. Hey, Mr. T., 8, Bloomfield Street, Derby.
29. Hughes, Mr. G. C., Rousham, Oxford.
30. Jenkin, Mr. Charles Frewen, 4, Vanburgh Park Road, West Blackheath.
31. Johnson, Professor T., D.Sc., Science and Art Museum, Kildare Street, Dublin.
32. Louth, The Antiquarian and Naturalists' Society, Louth.
33. Macfie, Mr. John William Scott, B.A., Rowton Hall, Chester.
34. Mackenzie, Mr. D., 12, James Watt Street, Glasgow.
35. Mason, Dr. Philip B., Trent House, Burton-on-Trent.
36. Missouri, The Botanical Garden, St. Louis Mo., United States of America.
37. Montague, Mrs. A., Penton, Crediton, N. Devon.
38. Newcastle-upon-Tyne, The Literary and Philosophical Society.
39. Oliver, Professor F. W., M.A., D.Sc., Botany Laboratory, University College, Gower Street, London, W.C.
40. Paul, Rev. David, LL.D., 53, Fountainhall Street, Edinburgh
41. Peacock, Dr. H. G., Broadlands, Highweek, Newton Abbott.
42. Pipe, Mr. Charles, Broad Street, Worcester.
43. Plowright, Mr. Charles B., M.D., King's Lynn.
44. Plowright, Mr. Charles Tertius Maclean, B.A., King's Lynn.
45. Potter, Professor M. C., M.A., Durham College of Science, Newcastle-upon-Tyne.
46. Ramsay, Mr. A., 4, Cowper Road, Acton, London.
47. Rayner, Mr. John Frederick, Ivy Bank, Highfield, Southampton.
48. Rea, Mr. Carleton, B.C.L., M.A., 34, Foregate Street, Worcester.
49. Rea, Mrs. Emma Amy, 34, Foregate Street, Worcester.
50. Renny, Mr. James, Chepstow House, Southfields, London, S.W.
51. Robinson, Mr. J. B., St. Mary's Lane, Louth.
52. Rose, Mr. John, 17, The Tything, Worcester.
53. Slater, Mr. B., F.L.S., Yorkersgate, Malton.
54. Smith, Miss Annie Lorrain, 8, Essex Grove, Norwood, S.E.
55. Smith, Mr. Worthington G., 121, High Street, Dunstable.
56. Spencer-Perceval, Mr. Cecil H., Longwitton Hall, Morpeth.

57. Stretton, Mr. A., 17, The Tything, Worcester.
58. Swanton, Mr. E. W., The Educational Museum, Haslemere.
59. Trail, Professor James W. H., M.D., F.R.S., The University, Aberdeen.
60. Wager, Mr. Harold, F.L.S., Arnold House, Bass Street, Derby.
61. Ward, Professor H. Marshall, D.Sc., F.R.S., F.L.S., &c., University Botanical Laboratory, Cambridge.
62. Watson, Dr., Deputy Surgeon General, University Club, Edinburgh.
63. Weiss, Professor F. E., Owen's College, Manchester.
64. White, Mr. J. Hill, F.R.H.S., 54, Broad Street, Worcester.
65. Woolhope, The Naturalists' Field Club, Hereford.

OFFICERS FOR THE SEASON 1902.

President: Professor James W. H. Trail, M.D., F.R.S., The University, Aberdeen.

Vice-President: C. B. Plowright, M.D., King's Lynn.

Hon. Secretary and Treasurer: Carleton Rea, B.C.L., M.A., &c., 34, Foregate Street, Worcester.

THE HEREFORD FORAY.

22nd to 27th September, 1902.

The sixth annual week's Fungus Foray was held at Hereford, on the invitation of the well-known Woolhope Naturalists' Field Club, which in former days had done so much to foster and encourage the study of mycology by bringing its devotees together at their annual forays. The Woolhope Club very kindly placed at the disposal of the British Mycological Society their Club Room at the Public Library, and numerous works on mycology. The members assembled at the Woolhope Club Room, Hereford, on Monday, the 22nd of September, and a few specimens were put out on exhibition. Mr. Charles T. M. Plowright brought from Putney some nice examples of *Merulius Guillemoti* Boud., a species which the Hon. Secretary said he had found on the stands at the cricket ground at Worcester in June, 1902. He also brought from Epping Forest *Flammula decipiens* W. G. Smith; *Polyporus cuticularis* Fr., *Fomes applanatus* Wallr., and *Trametes cinnabarina* Jacq., and Mr. Rea some specimens of *Geoglossum hirsutum* Pers. and *glabrum* Pers., from the Forest of Dean.

On Tuesday, the 23rd of September, the famous Dinmore Woods were explored, and some good finds rewarded the members, viz.: *Geaster rufescens* Pers., *Lactarius scrobiculatus* Fr., *Leptonia euchroa* Pers., *Marasmius Vaillantii* Fr., and two Clavariæ new to the British Fungus Flora, namely, *Clavaria Michelii* Rea=*Clavaria fragilis* Holmsk. var. *C. gracilis* Pers., and *Clavaria subtilis* Pers., the latter, however, had been gathered in the Forest of Dean at a meeting of the Worcestershire Naturalists' Club on the 16th of September, 1902, and Dr. Plowright gathered the rare *Clavaria rufa* Fl.D., and *Omphalia retosta* Fr. In the evening the Society's dinner was held at the Green Dragon Hotel, and afterwards at the Headquarters (the Woolhope Room), the presidential address was read on behalf of the President, Professor W. H. Trail, M.D., F.R.S., who was at the last moment imperatively prevented from attending the meeting. It was entitled, "Distributional Records," and dealt chiefly with the following questions. Did some plant appear to be indigenous? If of recent origin, could it be determined when, how, or whence it came? How was it related to its environment? Was it extending its range or becoming less common? What was its relation to man

in the district? He then pointed out minute methods for recording such observations on detailed maps, and thought that such a process was applicable to fungi.

On Wednesday, the 24th of September, the members started at mid-day from the Headquarters in carriages for the grounds and woods of Belmont and Haywood Forest. Amongst the specimens collected we note fine examples of *Lycoperdon echinatum* Pers., *Marasmius urens* Fr., and *Hudsoni* Fr. (at its original station at Belmont), *Tubaria crobula* Fr., *Boletus castaneus* Bull., *Mycena olivaceomarginata* Mass., *Pluteus umbrosus* Pers. and *Clavaria dissipabilis* Britz. At the evening meeting at the Headquarters the Hon. Treasurer reported that he had at that date a balance of £24, but that donations to the printing fund would still be gratefully received, as the cost of their Transactions still exceeded their income by a good deal, the cost of plates being, as they all knew, very expensive, but absolutely necessary to maintain the Transactions in a state of efficiency. The Hon. Secretary reported that eighty-three members had now been enrolled as foundation members, of which fifty-three may now be considered as on the active list. Since his last report four new members have joined the Society, namely—Dr. C. Theodore Green, M.R.C.S., England, L.R.C.P., London, F.L.S., Professor J. Brentland Farmer, F.R.S., The Library and Philosophical Society, Newcastle-upon-Tyne, and the Missouri Botanical Garden, St. Louis, Mo., U.S.A., and one resignation has been received from Mr. E. S. Salmon. The election of officers was then proceeded with, and the Rev. W. L. W. Eyre, M.A., was unanimously elected President; Professor H. Marshall Ward, D.Sc., F.R.S., & Vice-President, and Mr. Carleton Rea, B.C.L., M.A., was prevailed upon to accept the post of Hon. Secretary and Treasurer for another year. It was decided that the next annual week's foray should be held in Savernake Forest, with Marlborough for headquarters, in the first week of October, 1903.* A short note was then read on behalf of their member, Dr. C. Theodore Green, F.L.S., on "*Cintractia cingens*" De Toni, which he had found in July, 1902, growing upon Linaria vulgaris at Glyndyfrdwy, in Denbighshire, in a shady lane near the river Dee. "The foliage of the Linaria which had not flowered looked chlorotic, to use a medical phrase that fits the condition exactly. A closer examination of these yellowish-green shoots shewed that both stem and leaves presented slatey coloured streaks that were evidently well within the tissues. On placing sections beneath the microscope the cause of this was shewn to be numerous dark brown spores arranged in groups around the long axis of the stem and the midrib of the leaves. Some underground shoots, blanched through lack of sunlight, shewed the same slatey colour from the same cause, though

* Monday the 5th October to Saturday the 10th October, 1903.

in less degree. This is the first recorded appearance of this Ustilago in Britain, and it is rare even on the Continent of Europe." And Mr. Carleton Rea, B.C.L., M.A., read a note on "A very abnormal form of *Agaricus arvensis* Schaeff," illustrated by a painting by Mrs. Rea. "The specimen was deposited on the exhibition table of fungi at the Victoria Institute, Worcester, in the autumn of 1902 by a person unknown. The upper surface of the Pileus was normal, but the whole of the underside was covered with gills very labyrinthiform, poriform, anastomosing and daedalioid in character; the gills were very shallow, but the spores were normal. No trace of a stem was extant, and the only explanation of this abnormal condition which he could offer was this: He presumed that the pileus was separated from the stem by somebody gathering mushrooms, or by some other animal agency, and this separation is easily effected as the flesh of the stem is not confluent with the flesh of the pileus. Did not the hymenial hyphæ after the removal of the stem develop the hymenium on the whole of the under surface of the pileus, including that portion originally occupied by the stem, or did the vegetative hyphæ become potential hymenial hyphæ? This raised a broad question, as hitherto it had been considered that at some preceding stage the hyphæ had been differentiated into hymenial and vegetative. Sports as a rule now-a-days are considered to give some indication of the ancestry of a species, and the present example probably shewed that the differentiation of the hyphæ had only been recently acquired."

On Thursday, the 25th of September, the members drove from the Headquarters at 12 o'clock to Rotherwas, from whence a walk was taken through the woods to Dinedor Camp. In Rotherwas wood Dr. Plowright secured many examples of *Rosellinia clavariae* Tul., and *Eccilia atropuncta* Pers., whilst other members collected fine specimens of *Cortinarius (Phlegmacium) triumphans* Fr., *Hygrophorus subradiatus* var. *lacmus* Fr. and *Clavaria stricta* Pers. In the evening, at the Headquarters, Mr. R. H. Biffin, M.A., gave a very interesting lecture on "Some facts in the life history of *Acrospeira mirabilis* B. and Br." (see p. 17); Miss A. Lorrain Smith read "Notes on a species of Stilbum" (see p. 25), and a paper on "Lindroth's classification of the Uredineæ of the Umbelliferæ" (see p. 26), was read on behalf of Dr. C. B. Plowright. Hearty votes of thanks were then accorded to the Woolhope Naturalists' Field Club for placing their Club Room and books at the disposal of the British Mycological Society, to Dr. H. Cecil Moore for the great trouble he had taken in arranging the details of the foray and obtaining the necessary permissions from landowners and tenants and for personally conducting them through their daily excursions, and to the landowners and tenants for their kind permission to visit their estates, and Dr. H. Cecil Moore was further requested to convey these resolutions to the proper persons, a task which he most kindly undertook to do.

On Friday, the 26th of September, the members assembled at the Headquarters at mid-day and drove to Holme Lacy Park, the seat of the Earl of Chesterfield. Here the Park and adjoining woods were thoroughly searched and yielded several interesting species, including *Pleurotus applicatus* Batsch., *Entoloma Saundersii* Fr., *Stropharia caput-Medusae* Fr., *Cortinarius (Phlegmacium) balteatus* Fr., *Paxillus giganteus* Fr., *Hygrophorus fornicatus* Fr., *H. calyptraeformis* B. and Br., *H. nitratus* Fr., and *Daldinia concentrica* Ces. & de Not. on birch.

Over 385 species were collected during the week, and Miss A. Lorrain Smith subsequently reported that the foray at Belmont had produced one mould new to Britain, *Monilia candicans* Sacc., and another which the Editor also regards as new to the British Flora, viz., *Stysanus fimetarius* Karst. on decaying vegetable matter, as he does not consider that Messrs. Massee's and Salmon's enumeration of it as occurring on the dung of Sinaitic Ibex and Common Camel can possibly be regarded as a British record thereof.

Complete List of Fungi gathered during the Foray.

Amanita phalloides Fr., mappa Fr., pantherina Fr., muscaria Fr., rubescens Fr.

Amanitopsis vaginata Roze.

Lepiota procera Scop., rachodes Vitt. and var. puellaris Fr., excoriata Schaeff., cristata A. and S., granulosa Batsch.

Armillaria mellea Vahl., mucida Schrad.

Tricholoma sejunctum Sow., acerbum Bull., flavo-bunneum Fr., albobrunneum Pers., rutilans Schaeff., columbetta Fr., terreum Schaeff., saponaceum Fr., cuneifolium Fr., carneum Bull., melaleucum Pers., sulphureum Bull., panaeolum Fr., grammopodium Bull.

Clitocybe clavipes Pers., odora Bull., rivulosa Pers., maxima Fl. Wett., infundibuliformis Schaeff., geotropa Bull., inversa Scop., metachroa Fr., fragrans Sow.

Laccaria laccata Scop.

Collybia radicata Relh., longipes Bull., platyphylla Fr., fusipes Bull., maculata A. and S., butyracea Bull., vertirugis Cke., confluens Pers., tuberosa Bull., acervata Fr., dryophila Bull., rancida Fr.

Mycena pelianthina Fr., Iris Berk., olivaceo-marginata Mass., pura Pers., luteo-alba Bolt., rugosa Fr., galericulata Scop., polygramma Bull., alkalina Fr., ammoniaca Fr., filopes Bull., sanguinolenta A. and S., galopoda Pers., epipterygia Scop., tenerrima Berk., discopoda Lev., capillaris Schum.

Omphalia retosta Fr., grisea Fr., fibula Bull.
Pleurotus applicatus Batsch.
Pluteus cervinus Schaeff., umbrosus Pers.
Entoloma sinuatum Fr., lividum Bull., Saundersii Fr., jubatum Fr., sericellum Fr., sericeum Bull., nidorosum Fr.
Clitopilus prunulus Scop.
Leptonia lampropoda Fr., serrulata Pers, euchroa Pers.
Nolanea pascua Pers., picea Kalchbr., infula Fr.
Eccilia atropuncta Pers.
Claudopus variabilis Pers.
Pholiota praecox Pers., radicosa Bull., squarrosa Müll., spectabilis Fr.
Inocybe lanuginosa Bull., pyriodora Pers., incarnata Bres., fastigiata Schaeff., rimosa Bull., asterospora Quél., geophylla Sow., scabella Fr., and tricholoma A. and S.
Hebeloma fastibile Fr., mesophaeum Fr., crustuliniforme Bull.
Flammula decipiens Sm., flavida Schaeff.
Naucoria melinoides Fr., escharoides Fr.
Galera tenera Schaeff., hypnorum Batsch.
Tubaria furfuracea Pers., crobula Fr.
Crepidotus mollis Schaeff.
Agaricus arvensis Schaeff., campestris Linn., var silvicola Vitt., silvaticus Schaeff., hæmorrhoidarius Kalchbr., comtulus Fr.
Stropharia æruginosa Curt., albo-cyanea Desm., inuncta Fr., squamosa Fr., thrausta Kalchbr., and var aurantiaca Cke., semiglobata Batsch., caput-Medusæ Fr.
Hypholoma sublateritium Schaeff., fasciculare Huds., pyrotrichum Holmsk., velutinum Pers., appendiculatum Bull., hydrophilum Bull.
Psilocybe semilanceata Fr., var caerulescens Cke., fœnisecii Pers.
Psathyra corrugis Pers.
Anellaria separata Karst.
Panæolus papilionaceus Fr., campanulatus Linn.
Psathyrella gracilis Fr., atomata Fr.
Coprinus comatus Fr., atramentarius Fr., fimetarius Fr., var cinereus Schaeff., niveus Fr., micaceus Fr. plicatilis Fr.
Bolbitius fragilis Fr.
Cortinarius (Phlegmacium) triumphans Fr., balteatus Fr., varius Fr., largus Fr., caerulescens Fr.
(Myxacium) elatior Fr., delibutus Fr.
(Inoloma) pholideus Fr.
(Dermocybe) tabularis Fr., caninus Fr., lepidopus Cke., sanguineus Fr., cinnamomeus Fr.
(Telamonia) torvus Fr., impennis Fr, hinnuleus Fr., brunneus Fr., hemitrichus, Fr., paleaceus Fr.
(Hygrocybe) dolabratus Fr.
Paxillus giganteus Fr., involutus Fr.

Hygrophorus cossus Fr., discoideus Pers., pratensis Fr., virgineus Fr., niveus Fr., fornicatus Fr., subradiatus Fr., var lacmus Fr., laetus Fr., ceraceus Fr., coccineus Fr., miniatus Fr., puniceus Fr., conicus Fr., calyptræformis B. & Br., chlorophanus Fr., psittacinus Fr., nitratus Fr.

Lactarius scrobiculatus Fr., torminosus Fr., turpis Fr., pubescens Fr., insulsus Fr., blennius Fr., circellatus Fr., uvidus Fr., pyrogalus Fr., chrysorheus Fr., piperatus Fr., vellereus Fr., deliciosus Fr., pallidus Fr., quietus Fr., aurantiacus Fl. Dn., glyciosmus Fr., serifluus Fr., mitissimus Fr., subdulcis Fr.

Russula nigricans Fr., adusta Fr., chloroides Kromb., furcata Fr., depallens Fr., lepida Fr., vesca Fr., cyanoxantha Fr., foetens Fr., fellea Fr., emetica Fr., ochroleuca Fr., fragilis Fr. var violacea Quél., aurata Fr., nitida Fr. var pulchralis Britz., alutacea Fr., armeniaca Cke., lutea Fr.

Cantharellus cibarius Fr., tubæformis Fr., infundibuliformis Fr.

Nyctalis parasitica Fr.

Marasmius urens Fr., peronatus Fr., oreades Fr., Vaillantii Fr., ramealis Fr., rotula Fr., androsaceus Fr., Hudsoni Fr., epiphyllus Fr.

Panus conchatus Fr., stipticus Fr.

Lenzites betulina Fr.

Boletus elegans Schum., flavus With., granulatus Linn., piperatus Bull., chrysenteron Fr., subtomentosus Linn., edulis Bull., luridus Schaeff., laricinus Berk., versipellis Fr., scaber Fr., castaneus Bull.

Fistulina hepatica Fr.

Polyporus squamosus Fr., picipes Fr., giganteus Fr., dryadeus Fr., hispidus Fr., cuticularis Fr., mollis Fr., betulinus Fr., adustus Fr.

Fomes ulmarius Fr., connatus Fr., fomentarius Fr., annosus Fr., applanatus Wallr., ferruginosus Fr.

Polystictus perennis Fr., versicolor Fr., hirsutus Fr.

Poria vaporaria Fr., medulla-panis Fr.

Trametes gibbosa Fr., cinnabarina Jacq.

Daedalea quercina Pers.

Merulius corium Fr., Guillemoti Boud.

Hydnum repandum Linn., rufescens Pers., auriscalpium Linn.

Radulum orbiculare Fr.

Grandinia granulosa Fr.

Craterellus cornucopioides Pers., sinuosus Fr.

Thelephora fastidiosa Fr.

Stereum purpureum Pers., hirsutum Fr., spadiceum Fr., rugosum Fr.

Corticium sambuci Fr., sanguineum Fr., comedens Fr.

Hymenochaete tabacina Lév.

Peniophora quercina Cke., cinerea Cke.

Coniophora puteana Mass.
Clavaria muscoides Linn., cinerea Bull., cristata Pers., rugosa Bull., subtilis Pers., stricta Pers., rufa Fl. Dan., fusiformis Sow., inæqualis Fl. Dan., fragilis Holmsk., Michelii Rea, dissipabilis Britz , pistillaris Linn.
Auricularia mesenterica Fr.
Calocera viscosa Fr., stricta Fr.
Tremella lutescens Fr., tubercularia Berk.
Exidia glandulosa Fr.
Scleroderma vulgare Fr., verrucosum Pers.
Cyathus striatus Hoffm.
Crucibulum vulgare Tul.
Sphaerobolus stellatus Tode.
Lycoperdon echinatum Pers., excipuliforme Scop., gemmatum Batsch., pyriforme Schaeff., plumbeum Pers., nigrescens Vitt.
Geaster rufescens Pers., fimbriatus Fr., Bryantii Berk.
Ithyphallus impudicus Fisch.
Mutinus caninus Fr.
Hysterographium Rousselii Sacc., Belmont.
Propolis faginea Karst., Dinmore.
Karschia lignyota Sacc., Holme Lacy.
Orbilia leucostigma Fr., Holme Lacy.
Bulgaria polymorpha Wettstein.
Ombrophila clavus Cke.
Coryne sarcoides Tul.
Tapesia caesia Fckl.
Lachnea scutellata Gillet.
Dasyscypha hyalina Mass., Belmont.
Humaria omphalodes Mass.
Peziza succosa Berk.
Helvella crispa Fr., lacunosa Afzel., macropus Karst.
Leotia lubrica Pers.
Spathularia clavata Sacc.
Geoglossum glabrum Pers., hirsutum Pers.
Nectria coccinea (Pers.), Holme Lacy.
Trichosphaeria barbula (B. and Br.), Holme Lacy.
Diatrype stigma Fr., Belmont.
Hypoxylon udum Fr., Holme Lacy, fuscum (Pers.)
Rosellinia Clavariæ (Tul.), and the conidial condition known as Scolecotrichum clavariarum Sacc., on Clavaria cinerea Bull.
Ceratostomella cirrhosa Sacc., Holme Lacy.
Anthostoma melanotes Sacc., Holme Lacy.
Daldinia concentrica Ces. and de Not., on birch.
Xylaria hypoxylon Lin.
Physarum nutans Pers., bivalve Pers.
Craterium pedunculatum Trentepohl.

Leocarpus vernicosus Link.
Chondrioderma spumarioides Rost.
Didymium difforme Duby.
Comatricha obtusata Preuss.
Reticularia Lycoperdon Bull.
Trichia persimilis Karst., fallax Pers., varia Pers.
Arcyria punicea Pers.
Monilia candicans Sacc., Belmont.
Cephalosporium acremonium Corda., Belmont.
Botrytis cinerea Pers., Belmont.
Torula antennata Pers., Dinmore.
Periconia pycnospora Fres., Belmont.
Stysanus fimetarius Karst., Belmont.

M.C.C. del. West, Newman chr.

Collybia pulla Schaeff.

RECENT BRITISH FUNGI.

By M. C. Cooke.

WITH PLATE I.

Amanita cariosa Fries. Hym. Eur. p. 24.

Pileus convex, then plane, soft, even, unequally clad with mealy patches ($3\frac{1}{2}$-$4\frac{1}{2}$ in.), flesh white, stem stuffed then hollow (4-5 in. long, $\frac{3}{4}$ in. thick), fragile, nearly equal, smooth; superior ring, at length falling away; gills adnate, then seceding, and free spores 10μ long. Sacc. Syll., 32. Gonn. and Rabh., t. 9, f. 3.

In woods. Huddersfield, September, 1895.

Fries places it near *A. spissa.*

Schulzeria lycoperdoides Cooke and Massee.

Pileus convex, then expanded, soft, tan-coloured, beset with darker pyramidal warts, resembling those of some species of *Lycoperdon*, and often splitting at the base; margin appendiculate, stem equal, solid, minutely fibrillose, whitish; gills rather crowded, free, white.

On the ground, under cedars. Kew.

Pileus $1\frac{1}{2}$ in. broad. Stem 2 in. long. Spores oval. $5 \times 4\mu$.

Armillaria caligata Viviani. F. Ital., t. 35.

Smell strong. Pileus compact, convex, then plane, tawny, weasel-colour, spotted with adpressed silky squamules of the same colour; stem solid, beneath the persistent membranaceous ring zoned with brown squamules; gills emarginate, white. Sacc. Syll., No. 266. Arm. focalis, minor. Cooke Illus., t. 245.

On the ground, chiefly pine woods.

Stem 3-4 in. long, nearly 1 in. thick. Pileus 3 in. Spores globose 3-4μ diam. Doubtless *A. causetta* Barla. should be included in the same species.

Collybia pulla Schaeff., t. 25. Fries Ep., p. 114.

Pileus fleshy, thin, campanulate, then expanded, obtuse, even, smooth, hygrophanous; stem hollow, twisted, somewhat striate, soft, naked; gills adnexed, rather broad, transversely pellucid-striate, whitish. Sacc. Syll., 767. Bolton, t. 15.

Under birch, &c. Highbeech, Epping.

Stem premorsely rooting (3 in. long), cuticle soft, polished. Pileus fragile, purplish bay, nearly black, paler when dry (1 in. high, $1\frac{1}{2}$ in. broad). Spores 10μ long.

Collybia subelevata W. G. Smith.

Pileus submembranaceous, tough, campanulate, obtuse, dry, floccose, opaque, brown ($2\frac{1}{2}$ in. high, 4 in. broad). Stem elongated, hollow, rather slender, slightly attenuated upwards from the premorse base, flocculose, pale-brown (7 in. long, $\frac{1}{4}$-$\frac{3}{8}$ in. thick); gills adnexed, distant, very broad ($\frac{5}{8}$ in.), white.

In woods, amongst stumps. Epping.

Hygrophorus latitabundus Britz. Hygr. IV., fig. 14.

Pileus fleshy, convex, then expanded, smooth, sooty, becoming yellowish, with a tendency to olive; stem solid, firm, thick, viscid, rather scaly above; gills subdecurrent, distant, white. Sacc. Syll., No. 1568.

In woods. Street, Somerset.

Pileus 3-4 in. broad. Stem 3-5 in. long, 1 in. thick. Spores smaller than in *H. limacinus* (10×6-7μ); It is a larger and more robust species and has been confounded with it.

Hygrophorus clivalis Fries. Mon. II. p. 134.

Whitish, fragile, pileus thin, disc more fleshy, campanulate, then expanded, shining not viscid, margin at first bent inwards, then spreading, striate; stem solid, short, fragile, attenuated downwards; gills rather narrowed behind, almost free, ventricose, distant, and somewhat thick. Sacc. Syll., No. 1607. *Hygrophorus fornicatus* Cooke Illus., t. 933.

On damp slopes. Holme Lacy.

Smaller than *H. fornicatus*, with which it has been confounded. Spores 6-$7 \times 4\mu$.

Marasmius sclerotipes Bres. Fun. Trid., p. 12, t. XI., f. 1.

Pileus membranaceous, convex, margin inflexed, then plane, umbilicate, rugulose-striate, white, umbilicus yellow, subflocculose (6-8 mm. broad); gills distant, adnate, white, margin fimbriate; stem filiform, pruinose under a lens, pallid rufescent, apex whitish; base adnate to a yellowish rufescent sclerotium, equal (12-18 mm. long, $\frac{1}{2}$-1 mm. thick). Sacc. Syll., No. 2232. Collybia cirrhata Cooke Illus., t. 144 B.

On the ground in swampy places. Epping Forest.

In Cooke's Illustrations this was referred to *Collybia cirrhata*, with

the authority of the Rev. M. J. Berkeley, and strong urgency of Dr. H. Bull. Afterwards it was equally strongly contested and opposed by Dr. Max. Cornu. Undoubtedly according to Fries, *Collybia cirrhata* has no sclerotium, and the figure by Batsch, No. 95, thus represents it. Examination of specimens collected this year has led me to confess to the error, whilst referring them to Bresadola's *Marasmius*.

Glœosporium Bidgoodi Cooke.

Pustules rather large, covered by the blackened cuticle, at length ruptured for the escape of the conidia. The stroma upon which the conidia are produced is also blackened, but the conidiophores become hyaline above, bearing the narrowly elliptic conidia ($18\text{-}20 \times 4\mu$) which have two nuclei. No direct evidence that eventually they become uniseptate. Journ. Roy. Hort. Soc. XXVI., pp. CXXXIX. and CXLI.

On leaves of *Odontoglossum*.

Has been known for six or seven years, but not described. Leaves were submitted to Mr. Bidgood in 1901, who declared it to be a species of *Glœosporium*, but we have awaited his description in vain, and now take leave to associate it with his name. The conidia of *Glœosporium Vanillæ* are $14\text{-}16 \times 6\text{-}7\mu$; those of *G. cinctum* are $10\text{-}15 \times 2\frac{1}{2}\text{-}3\mu$; those of *G. oncidii* are $14\text{-}17 \times 4\frac{1}{2}\text{-}6\mu$; those of *G. orchidearum* are $20\text{-}25 \times 5\text{-}7\mu$; and those of *G. affine* are $14\text{-}20 \times 4\text{-}6\mu$, but other features have to be taken into account as well as the dimensions of the conidia.

Fusarium lini Bolley. U.S.A. Agr. Exp. St., N. Dakota. Bull. 50, 1901.

Vegetative hyphæ, light coloured, septate, branching irregularly, ramifying the tissue of the stems and roots of the host. Spore tufts (sporodochia) erumpent, compact, slightly raised, pale cream or flesh coloured. Sporophores short and closely branched, or conidia sometimes arising from wart-like protuberances, upon a common bed, or stroma. Conidia 4-celled, fusiform, slightly curved or falcate ($27 \times 3\mu$ to $38 \times 3\frac{1}{2}\mu$).

Living in the humus of the soil, attacking the seedlings of the flax plant, causing the disease known as "flax wilt." N. Ireland.

Already known in Holland, Belgium, Northern France, Germany and Ireland, but hardly known in Russia.

Coniothecium Questieri Desm. Pl. Crypt, 1857, p. 2.

Epiphyllous. Tufts superficial, very minute (25μ diam.), numerous, subspherical, effused, gregarious, black, shining. Conidia 6-10

conglobate in versiform glomerules, compressedly angular, brown, semi-opaque (10μ diam.). Sacc. Syll. IV., No. 2442.

On fading and dead blotches on leaves of apple. Sci. Com., R.H.S.

Scarcely to be deemed a parasite, as evidently it is not the cause of the withering of the leaves. Compared with authentic specimens and found to be the same. Originally discovered on leaves of *Cornus*.

Œdomyces leproides Trabut. Sacc. Syll. XI., p. 234.

Forming large nodulose, fleshy tumours on the upper part of the root of beet and on young potato tubers. Spores globose depressed, umber (40-50 × 30μ), acrogenous; mycelium inflated into a vesicle below the spores; spores produced in masses within spherical cysts in the substance of the tumours.

On beet root and potato tubers. Destructive.

Hitherto the tumours have been found in Britain on beet root, but without spores. Upon potatoes for the past two years the disease has been but too common, fully producing spores, and laying waste extensive crops. Dr. Magnus has determined the fungus of the potato tumour to be identical with that of the beet root, although it has been described under a different name as *Chrysophlyctis endobiotica* (Schilbersky).*

*Miss A. Lorrain Smith does not assent to this union (see p. 31 hereof).

ON SOME FACTS IN THE LIFE HISTORY OF *ACROSPEIRA MIRABILIS* (BERK. & BR.).

By R. H. Biffen, M.A.

With Plate II.

In the Annals and Magazine of Natural History for 1861 Berkeley and Broome described a curious mould fungus, found on Spanish Chestnuts at Bristol, under the name of *Acrospeira mirabilis*. The genus so founded* still remains monotypic, and beyond Berkeley's account of the development of the one spore form known to him, nothing further has been published with regard to its life history. It is always included in the Hyphomycetes in the Family of the Dematieæ on account of its dark-coloured "conidia."

Berkeley's detailed account of the fungus is to be found in his Introduction to Cryptogamic Botany (p. 305). I quote it in full. "But, perhaps, one of the most curious [Sepedonei†] is a species which occurs, not unfrequently, in imported Spanish Chestnuts. The white substance of the two large cotyledons is completely traversed and altered in texture by the mycelium of the mould, while a few fertile threads are produced in the free space between the cotyledons. If a slice of the diseased cotyledon be placed on damp soil under a bell-glass, in two or three days the threads are beautifully developed, and exhibit under the microscope a very curious condition. The tips of the fertile ramuli are curled into a little spiral, which after a time consists of about three articulations. All of these swell, but the second the most, so as to appear to be supported at its base by the other two. The integument becomes slightly rough and at length strongly granulated, like the spore of a *Genea*, and eventually, in some cases, a second spore is added at the tip."

Massee‡ describes the fungus also, but as follows:—"Sterile hyphae blackish-olive, floccose, interwoven, fertile, erect, vaguely branched above, tips of branches curved and closely septate; conidia subglobose, lateral near the tips of the branches, dark-coloured, minutely warted, 15-20 μ diam."

* Not to be confused with Acrospira (Mont.)

† Sepedonei. A subdivision of the Hyphomycetes with the fertile threads scarcely distinct from the mycelium, and the spores very abundant.

‡ A Text-book of Plant Diseases (p. 435).

Further (p. 305) "the ripe fruit of the sweet-chestnut (*Castanea vesca*, Gaertn.) is sometimes filled with a dense blackish-olive felt belonging to the fungus named above. Nothing as to the life history of the parasite is known." On comparing these descriptions one is at once struck by the fact that Berkeley makes no mention of this characteristic blackish-olive colour in his careful description of the fungus. This fact puzzled me for some time, for the fungus, as I found it and cultivated it, was obviously enough *Acrospeira mirabilis*, yet it showed no signs of this colouring. Further acquaintance with the fungi found in chestnuts has led me to conclude that Massee's description refers in part to one of the Dematieæ (which at present I cannot get to fruit), frequently occurring in them and traversing the whole nut with its olive-black hyphæ.*

Further, his figure in the British Fungus Flora, Vol. III., p. 358, fig.. 13, does not agree with Berkeley's original description or figures, or yet with a specimen from Broome in the Cambridge University Herbarium. It is suggestive of an imperfect realization of the true meaning of Berkeley's account.

The chestnuts from which I obtained my supply of *Acrospeira* were bought in Cambridge. The only information I was able to obtain with them was that they were grown in all probability in the South of Spain, and that the disease in some seasons caused a considerable loss. This was clearly the case, for thirty-five out of fifty nuts first examined were found to contain the chocolate-coloured powder formed by the loose mass of spores. As the nuts were too dry for the fungus to have spread much during transit, I assume they were infected before importation. The spores often filled the space between the cotyledons, and more rarely were found in abundance immediately within the carpel wall. The diseased tissue, instead of being white and crisp, was a pale ashy-brown colour and more or less powdery. Where the disease was only partial a dark brown line marked the limits of the diseased portion. Microscopic observation showed that this zone was occupied by a vigorous intercalary mycelium, without haustoria, which brought about, probably by the secretion of a cytase, a marked swelling of the cell walls. It had no especially marked distribution, though, if anything, it was most abundant in the neighbourhood of the vascular bundles of the cotyledons. The strongly thickened carpellary walls showed no signs of attack. Mixed with the *Acrospeira* I often found *Penicillium glaucum* and *Phoma eriophorum* (Berk. and Br.). These were separated by means of plate cultures, and when a perfectly pure growth of *Acrospeira* was obtained, pieces of chestnut, sterilized by suc-

* It is probably a species of Haplographium.

cessive boilings in plugged tubes, were infected from it. Under these conditions the fungus grew vigorously, forming a hardly visible, silky, web-like coating of mycelium, which, in about ten days, seemed to be transformed into a dense brown powder, owing to the abundance of spores it produced. In old cultures this layer was often two or three millemetres in thickness. On examining cultures a week old, the mycelium was found to be septate, colourless, and strongly vacuolated. Arising from it were numbers of upright a-septate hyphæ, branching to form either a simple or compound raceme. The ultimate branches were almost invariably in groups of threes. The apices of these branches bent over crozier-fashion, swelled slightly, and then coiled into a close spiral of one-and-a-half turns (Fig. 1a). Three transverse septa then appeared in this closely coiled portion, and frequently a fourth one lower down the hypha. The penultimate cell of the group, i.e. the middle one of the three, then increased in size rapidly, while the others grew more slowly. The result of this unequal growth was to fuse the three cells into a group in which the original spiral arrangement was lost sight of (Fig. 1b). At this stage the contents of the penultimate cell became strongly vacuolated, and its wall gradually thickened, became brown in colour, and covered with large warts. Similar changes, but far less pronounced, occurred in the other two cells. Meanwhile further septa were formed in the fertile hyphæ, and the group of three cells was cut off as a whole. It now consisted of a thick-walled, warted spore, partially invested by the cells originally immediately above and below it, though now displaced by the unequal swelling (Fig. 1c). From its mode of development, the central spore was evidently a chlamydospore, not a conidium.

Berkeley, in his original description, makes mention of certain abnormalities, and a striking point in the life history of this fungus is the frequency with which they occur. Normally, the group of three spores has much the appearance of a teleutospore of *Triphragmium*, in which two of the cells are only partially developed, but occasionally owing to the development of the two upper cells only they resemble those of a *Puccinia*, while more rarely *Phragmidium*-like groups were met with. The last two forms can be produced in abundance in cultures on melon-rind. In size, the normal spores were from 25-30μ in diameter, but when grown under water they were frequently as much as 45μ, and with thin, translucent, smooth walls. Grown in a very dry atmosphere they were only some 15-18μ in diameter, while the walls were very massive, dark brown, and again wartless. These marked changes in size, colour and markings, make one wonder whether we do not often lay too much stress on spore

characteristics, particularly in separating otnerwise somewhat similar species.

On germinating these chlamydospores the large, penultimate cell, and that one only, put out a mycelium. From its thick walls one might have concluded that it was a resting spore, like so many other chlamydospores, but it appears to be the spore form which serves for the rapid reproduction of the fungus, for it germinated in every case within forty-eight hours, usually in much less. The further development of the mycelium it formed was determined chiefly by the food supply available.

Thus, if the spores were sown on an extract of peas, made up with ten per cent. of gelatine, the mycelium grew slowly and remained altogether sterile, though transferred repeatedly to fresh supplies of pea extract. The sterile mycelium could, however, be induced to form a fresh crop of the chlamydospores if placed on pieces of sterilized chestnuts.

When germinated in beer-wort gelatine the mycelium produced the characteristic chlamydospores once more, but the submerged hyphæ, instead of remaining thread-like, became shortly septate, and some of the barrel-shaped cells so produced grew up into balloon-like structures, 100μ in diameter, whose walls either thickened considerably and became carbonized, or broke and set free what appear to be myriads of minute oil drops. The general appearance strongly suggested an attack by some fungus near the Chytridiaceæ, but subsequent investigation showed that this was not the case. The result is probably pathological, and determined by the amount of sugar present, for cultures of the fungus in 5 per cent. glucose, or cane sugar, give pure cultures of this form only.

When the chlamydospores were sown on a watery extract of chestnuts, made up with agar-agar, a further crop of chlamydospores were produced, and at the same time the submerged hyphæ gave rise to small bunches of flask-shaped swellings, in the tips of which small conidia were formed, and shot out every three or four hours. By keeping down the available food supply, by using very dilute watery extracts, the formation of the chlamydospores could be checked, and practically pure cultures of this peculiar conidial stage produced. Later on, particularly when the extract was not too dilute, these cultures gave rise to spore-balls so similar to those of *Urocystis violae*, that I could not find a single characteristic to separate them by. They contained a variable number of thick, brown-walled chlamydospores (1-6 as a rule), invested by a single layer of thin, almost colourless, envelope cells. A somewhat similar spore form was also found on examining the cultures on pieces of chestnuts. In these spore-balls the chlamydospores were far

more numerous, as many as twenty being not infrequently met with, and the envelope cells formed several layers. They occurred in fair abundance in the wet cotton-wool plugs supporting the pieces of chestnut, but they were only found once on the chestnut itself, and then in a cavity almost full of water.

On tracing their development in the chestnut cultures they were found to arise from hyphæ, at first similar to those which produced the chlamydospores described by Berkeley. Instead of cross septa being formed when the coil consisted of a single turn though, the hyphæ grew into helices with six or more turns, forming a structure identical with the ascogonium of an *Eurotium*. Then the upper turns put out a number of branches, which grew downwards, weaving in between one-another, and finally forming an investing case (Fig. 2). These enveloping hyphæ obscured any further changes going on in the original helix, so serial microtome preparations of these sporogenous bodies were made using material of various stages of growth. From these the details of development were readily traced. In the earlier stages the growth of the investing hyphæ pushed apart the coils of the helix to a certain extent. It then became shortly septate, some four to six septa being formed in each complete turn. The cells so formed increased in size rapidly, and acquired hard, brown, carbonized walls, which, owing to mutual pressure, were many-angled. At the same time, their cell contents became dense and full of deeply-staining granules. Meanwhile the contents of the investing hyphæ practically disappeared, while their walls became a pale translucent brown, so forming the envelope-case of the spore-ball (Fig. 3).

These spore-balls were then germinated on the media previously used, with the following results:— On pea extract the mycelium produced from each spore of the mass was sterile; on chestnut-agar endoconidia were produced, but not very abundantly; and on beer-wort gelatine the peculiar mycelium with short septa and strongly-swollen segments. These are precisely the same results as those obtained with the strikingly different spore form described first. Further, instead of producing the first form of chlamydospore, the chestnut-agar cultures gave rise to small spore-balls. The development of these was easily traced in hanging-drop cultures. A small helix of some two to four coils was first produced, from which very short hyphæ arose, which, instead of investing the coil by weaving together, remained closely adpressed to it, so forming an envelope layer of one cell in thickness. The coil then broke up into chlamydospores, in the fashion already described (Fig. 4).

From its mode of development, and from the fact that on germinating these smaller spore-balls, the results were identically the same as on germinating the larger ones, it was obvious that they were one and the same form, yet the morphological differences seemed great enough to almost warrant the supposition that they belonged to different genera of fungi. In the one case a single envelope layer enclosed from one to eight spores, in the other a many-layered envelope enclosed twenty or more. On casting round for an explanation of this fact, it was found that the differences were probably due solely to the amount of moisture present while the helices were developing. Where there was an excess of moisture, as in the case of those growing in the wet cotton-wool plugs, the large form was produced, while on the drier gelatine and agar-agar plates the smaller form only occurred. Further, by keeping the plate cultures very moist the short branches were induced to grow out into the long interweaving ones, and so to give rise to a many-layered envelope. Spore-balls, when half-developed, were transferred from these moist agar-chestnut cultures to other media, but beyond the investing hyphæ growing further to form fresh helices and spore-balls, nothing of interest was met with.

Here again, then, we have a case where simply changing one factor, namely, the rate of transpiration, produces differences in the spore form, great enough to lead one to suppose that one was dealing with two different species at least.

Since making these cultures I have found the small spore-balls in diseased chestnuts, though never associated with Berkeley's form. It must, therefore, be assumed that they are the normal form.

Besides producing the abnormal mycelium in beer-wort gelatine, the aerial hyphæ grew out into curious arches or spirals, which became shortly septate. Each segment then swelled out strongly, more particularly those towards the centre of the arch, and the walls became carbonized, so giving rise to structures very similar to the ascogonia (scolecites) described by Tulasne and Janczewski in the early stages of *Ascobolus* (Fig. 5). in spite of the carbonized walls these rows of cells were not spores, for no signs of germination could be obtained with them under any conditions, and certain facts seem to point to their further development along the lines of an Ascomycete. It is thus peculiarly interesting to note that one can determine solely by varying the food supply whether a helix producing chlamydospores, or this provisional scolecite, shall be raised. Moreover, if the young scolecite was transferred to agar-chestnut plates the fungus made the attempt to produce a spore-ball out of it by investing it with envelope branches. The attempt generally ended in failure, for single cells of the scolecite were often too big (70-80μ) to be readily invested.

At this stage it seemed feasible that the fungus was really an Ascomycete, although the spore-balls pointed to its being a near relation of some Ustilago, such as *Urocystis*, or possibly *Geminella*. It appeared to grow too readily as a saprophyte to belong to such a typically parasitic group as the smuts, and, further, endoconidia are characteristically produced by the Ascomycetes only, while *Eurotium*-like and *Ascobolus*-like ascogonia were more than suggestive of the latter. Nevertheless, a long series of experiments, carried out on all the media and under all the conditions I could command, gave no further results, and, finally, I had to fall back on infection experiments with the living nuts. For this purpose, what appeared to be sound nuts were infected with chlamydospores, or with the spore-balls, after carefully sterilizing the outer skin with an alcoholic solution of corrosive sublimate. The wounds were then dressed with paraffin wax to stop the entry of any other fungi, and the nuts were stored in slightly-moistened sand. Under these conditions it was possible to obtain a number of pure cultures of the fungus, though some of the nuts were attacked by *Penicillium* and *Mucor*. The chlamydospore infections gave a crop of chlamydospores only, the spore-balls gave spore-balls and small reddish-brown, hard-walled perithecia. The walls of the perithecia were smooth and without bristles, and the ostiole was small, and flush with the surface, *i.e.*, not raised on a papilla or forming a neck. It contained no paraphyses, but numbers of broadly club-shaped asci, each with eight elliptical, dark-walled spores, slightly pointed at each extremity. The development of these perithecia proved very difficult to trace, and all of the details have not so far been clearly made out. Thus the origin of the ascogenous hyphæ is still undetermined with any degree of certainty, and I have to assume that they spring from the scolecite. In the earliest stages I have been able to obtain the whole of the perithecium was filled with a pseudo-parenchyma of hyphæ, richly stored with food materials. Midway between the apex and the centre this parenchyma broke down, forming a spherical cavity lined with delicate hyphæ, all pointing in an upward direction, which finally formed the lining of the ostiole. The whole mass of pseudo-parenchyma then became disintegrated, and a bunch of branching ascogenous hyphæ pushed their way from the base into the pulpy mass so formed (Fig. 6). The tip of each branch then bent over crosier-fashion and became septate at the apex, the penultimate cell of the group giving rise to an ascus after the method described by Dangeard. The broken-down parenchyma appeared to serve as food-material for the developing asci, which matured rapidly, and practically filled the whole of the perithecium. Hitherto lack of

material has prevented my following out the germination of these ascospores in detail, though I hope to be able to do so before long. To obtain them free from any adhering spore-balls the perithecia were well washed in sterilized water, and then crushed in beer-wort gelatine, from which drops were removed and mounted in cells for microscopic observation. In the course of twenty-four hours (16° C) the spores germinated and quickly formed a vigorous branching mycelium, the aerial portions of which produced numbers of spore-balls, and not, as I had expected, the chlamydospore form first described. This is the only set of germinations I have, so far, had the opportunity of making, and whilst it proves that the ascogenous stage really belongs to *Acrospeira*, it still leaves open the question as to how the presumed cycle of ascospore to chlamydospore is brought about. It seems probable, though, that further experiments under varying conditions of food supply will clear up this point also.

Berkeley's *Acrospeira mirabilis* thus turns out to be one stage in the life history of a Sphaeria, a group of fungi which, from the biological point of view, very little is known at present. A careful study of the life histories of some of the Dematieæ would, in all probability, show that many more of them are merely stages in the life-history of species belonging to this group. This work will, however, have to be carried out along the lines laid down once for all by de Bary—the story must be followed out in cultures from spore form to spore form, for the mere juxta-position of two different spore forms, even when repeatedly met with, cannot be taken as certain evidence that the two are stages in the life history of one and the same fungus. Thus in the case before us the mere fact that the perithecia occur with the spore balls is valueless unless the germination of the ascospore is taken into account, and although the spore-balls and simpler chlamydospores do not occur together in nature, their connection is better proved than that of the former spore forms, for it rests on identity of results on germinating under a variety of conditions.

EXPLANATION OF FIGURES.

1. (a) Earliest stage in the development of chlamydospores; (b) the curled apex is septate and the penultimate cell *s* is beginning to outgrow the others; (c) the ripe spore.
2. First stages in the development of the spore-ball from a culture on sterilized chestnut, showing the formation of the envelope layers.
3. A spore-ball, in section, from a chestnut culture, with a many-layered envelope and many spores.

4. A spore-ball from a chestnut-agar culture, seen in optical section, with a single layer of envelope cells.
5. The "scolecite" stage from a spore-ball germinated in beer-wort gelatine.
6. Portion of a longitudinal section of an unripe perithecium, showing the young asci pushing through the disintegrated pseudo-parenchyma.
7. (a) An unripe ascus, and (b) an ascospore germinating in water after twenty-four hours.

NOTES ON A SPECIES OF STILBUM.

By Annie Lorrain Smith.

Stilbum tomentosum is a small white fungus with a fairly stout stalk, composed of hyphæ, which bear at the tips chains of spores, the whole forming a compact globose head. It grows on *Trichia* and some other Mycetozoa. The first account of the species is given with a rather indistinct figure in *Schrader's Journal für der Botanik* II., p. 65, published in 1799. The author so named it on account of a byssoid white tomentum from which the stalk emerged. He suggests that the plants figured by Bulliard, of *Mucor villosus*, Pl. 504, fig. 15, may be a young stage of the same fungus.

The next mention is by Persoon in 1801, in his *Synopsis Methodica Fungorum*, p. 680. He describes it as parasitic and with a tomentose stalk, but suggests that the byssoid tomentum may have developed in the process of drying. He thinks the name "*parasiticum*" would have been more adapted to the habit of the plant.

Persoon's suggestion is adopted by Ditmar, who figures and redescribes the fungus in Sturm's *Deutschland's Flora*, Heft. 3, p. 93, tab. 46. He calls it *S. parasiticum*, Pers., and says the stalk is glabrous but of a vesicular, floccose texture. He thinks that the felted mycelium noted by Schrader is some other white mould. He gives a characteristic figure of the plant, with the tiny globose spores.

In 1827 it was included by Greville in the British Flora. He records the finding of it by Berkeley in Glenfinlas. He goes

back to Schrader's name, even though he considers it inappropriate.

It has been found growing on *Trichia* in Europe, Ceylon, N. America, and Cuba. My interest in the fungus was aroused by the difference in the form and size of the spores, which puzzled me in my attempts to classify various specimens. The stalk I have always found to accord with Greville's description, "set with minute pellucid roundish processes." The spores in Greville's and Ditmar's figures are small round bodies. Saccardo describes them as "globosis exiguis," and Massee, in his Fungus Flora, adds the exact measurement as 2-3 μ in diameter. Specimens sent to me from Devonshire and Hampshire tally with the above descriptions: the stalks are beset with processes, the spores are globose, though smaller somewhat. They are extremely minute. I received still another specimen from Egham, in Surrey, which had a similar stalk, but the spores are oval in form and measure up to 5 μ by 2 μ. On exàmining *Stilbum tomentosum* in the National Herbarium at S. Kensington, I found a Ceylon specimen in the Broome collection, in which the spores have been drawn and measured by that careful worker; they are oval in form and ·0002in. long or 5 μ There are other specimens in the Broome herbarium collected in England, but the spores are not figured. The difference between the spores of the two kinds of *Stilbum* amounts almost to a specific distinction, but the plants are otherwise so much alike, that it seems better to distinguish the second as a variety. The form with globose spores has the priority; the other I propose to name var. *ovalisporum.*

LINDROTH'S CLASSIFICATION OF THE UREDINEÆ ON THE UMBELLIFERÆ.

By C. B. Plowright, M.D.

The recently published work of J. I. Lindroth, published at Helsingfors, *Die Umbelliferen-Uredineen*, consists of a classification and description of all the known species, some eighty-eight in number, of uredines which attack umbelliferous plants. It may not be uninteresting to see what would be the arrangement of our British species under this system.

The author divides the Pucciniæ on the Umbelliferæ—which are by far the most numerous—into four groups: (1) Those

with reticulate teleutospores; (2) with verrucose; (3) with smooth; (4) with well developed teleutospores thickened above, on coloured persistent stems; and (5) a group which includes four exotic Lepto-pucciniæ.

PUCCINIÆ.

I. RETICULATÆ.—Teleutospores with reticulated epispores.

1. Puccinia Smyrnii-olusatri, D.C.
   Spermogonia, Æcidia and teleutospores.
   On Smyrnium Olusatrum, L.

2. P. Chærophylli, Purt.
   Spermogonia, Æcidia, uredo and teleutospores.
   On Anthriscus sylvestris, Hoffm.
   Myrrhis Odorata, Scop.

3. P. Pimpinellæ, Strauss.
   Spermogonia, Æcidia, uredo and teleutospores.
   On Pimpinella Saxifraga, L.

4. P. Heraclei, Grev.
   Spermogonia, Æcidia, uredo and teleutospores.
   On Heracleum Sphondylium, L.

5. Puccinia bulbocastani, Cum.
   Spermogonia, Æcidia and teleutospores.
   On Carum Bulbocastanum, Koch.

6. P. Cicutæ, Lasch.
   Spermogonia, Æcidia, uredo and teleutospores.
   On Cicuta virosa, L.

II. PSORODERMÆ.

Epispore of the teleutospores verrucose.

7. P. Hydrocotyles, Link.
   Spermogonia, Æcidia, uredo and teleutospores.
   On Hydrocotyle vulgaris, L.

III. BULLATÆ.—Teleutospores smooth, uredospores distinctly thickened above.

8. P. Petroselini, D.C.
   Spermogonia, uredo and teleutospores.
   On Æthusa Cynapium, L.
   Carum Petroselinum Benth. and Hook. fil.

9. P. Conii, Strauss.
Uredo and teleutospores.
On Conium maculatum, L.

10. P. Angelicæ, Schum.
Spermogonia, primary uredo, secondary uredo, primary teleutospores and secondary teleutospores.
On Angelica sylvestris, L.

11. P. Apii, Desm.
Spermogonia, Æcidia, uredo and teleutospores.
On Apium graveolens, L.

12. P. bullata, Pers.
Spermogonia, primary uredo, secondary uredo, primary teleutospores, and secondary teleutospores.
On Silaus flavescens Bernh.

13. P. Ægopodii, Schum.
Uredo teleutospores.
On Ægopodium Podagraria, L.

14. P. tumida, Grev.
Teleutospores.
On Conopodium denudatum, Koch.

15. P. Saniculæ, Grev.
Spermogonia, Æcidia, uredo and teleutospores.
On Sanicula europæa, L.

16. P. Bupleuri-falcati, D.C.
Spermogonia, Æcidia, uredo and teleutospores.
On Bupleurum tenuissimum, L.

IV.—Teleutospores, long covered by the epidermis; on persistent coloured pedicels. No British species.

V.—No British species.

UROMYCES.

No British species.

HETERŒCIOUS ÆCIDIA.

17. Pucinia Conopodii, Kleb.
Æcidia on Conopodium denudatum, Koch.
Teleutospores on Polygonum bistorta, L.

AGARIC TRANSFORMATIONS.

By M. C. Cooke.

It is still a problem whether—and to what extent—Hymenomycetal fungi may be modified in respect of their chemical constituents, by the soil in which they grow, or the circumstances by which they may be surrounded. There are a few pertinent facts, which have led me to the conclusion that close observation is necessary, and the record of illustrative phenomena would be useful, in determining whether Agarics, belonging morphologically to the same species, from which they do not appear to vary externally in the slightest appreciable degree, may not sometimes possess properties which prevent their use as articles of food, and at other times be perfectly harmless and edible. In point of fact, can we believe that an Agaric which normally is acrid, and injurious as an esculent, may be developed under other circumstances, with the same external features, but which is devoid of any acridity, and is mild and agreeable, and may be eaten with impunity. The question to be determined is, whether we are to regard these two forms as modifications of the same species, or whether the difference should constitute a specific distinction.

I may be permitted to illustrate my meaning by an appeal to examples. Most practical mycologists are aware that the typical form of *Russula rubra* (Cooke Handbook, No. 1,203) is intensely acrid, and is generally characterized as poisonous; whereas I have found, more than once, specimens which possess all the characters of the original species, except that they are mild to the taste, and may be eaten without inconvenience (compare "Illustrations" plate 1,025, and plate 1,087). The latter corresponds to the *Russula atropurpureus* of Krombholz (pl 64, figs. 5-6), and has been called by me *Russula rubra* var. *sapida*. Krombholz calls it "mild."

Another instance may be found in *Russula fœtens* (Cooke Handbk. No. 1,216), which, in its normal condition, is well known by its characteristic external features, as well as by its acrid taste, and repulsively fœtid odour. What are we to say of the specimens which I have met with, and submitted to the judgment of friends around me, which precisely resemble the typical species in everything else, but which possessed no acridity to the taste, and were not only quite free from any

fœtid odour, but, on the contrary, were pleasant and decidedly fragrant.

Again, what are we to say of the brown form of *Amanitopsis vaginata*, often met with in company with the grey form, the latter being in my experience exceedingly delicate in flavour, and was always eaten by myself, and my late friend, Dr. Wharton, with great appreciation. This testimony cannot be given by me in favour of the brown form, which, when tested on two or three occasions, caused unpleasant symptoms in the gastric regions, and has since been discarded from the table. On the contrary, a letter before me states "personally, I consider *A. vaginata* by far the most delicious of our esculent fungi, and we eat with impunity the fulvous form just as much as the grey form." Nevertheless Massee declares it to be "unpalatable," and several continental authorities call it "suspected" or "not esculent." At one time I contemplated, as a measure of precaution, to call the brown variety *Amanitopsis fulva*, as some continental mycologists have done, but fail to find any distinct morphological distinction, capable of diagnosis.

I need scarcely multiply examples, save to allude, in passing, to a variety of *Agaricus campestris*, which is sometimes found in pastures, with a dark brownish pileus, the eating of which has several times been communicated to me by correspondents, to have produced unpleasant results.

The suggestion which I would venture to offer, respecting these variations, is that some means should be taken, if possible, to ascertain whether the abnormal conditions found in these varieties can be attributed to any alteration in the chemical constituents of the soil in which they were found, or any external circumstances which could transform such susceptible cellular organisms as Agarics from acrid to mild, or vice versa.

In conclusion, I may remark, as a personal experience, that the specimens of *Psilocybe semi-lanceatus* sent to me for report, on two or three occasions, when children have been poisoned by eating them, have invariably belonged to the variety which I have called *cærulescens*, in which the base of the stem becomes of an indigo-blue colour. Can it be that this variety only is poisonous, and that it is indicated by the blue colour, and, moreover, that this coloration results from some unknown external conditions, which alter the chemical constituents of the fungus. These appear to me to be problems which are worthy of solution.

FUNGI NEW TO BRITAIN.

By Annie Lorrain Smith and Carleton Rea, B.C.L., M.A., &c.

Chrysophlyctis Schilb. Ber. d. Deut. Bot. Ges. XIV. 1896.

Sporangia thick-walled, golden brown, without mycelium, spherical, containing zoospores, occurring singly or a few together among the cells of the host plant.

C. endobiotica Schilb.

Occurring on the tubers and lower leaves of the Potato, causing gall-like outgrowths, the outer layers of the galls especially crammed with sporangia. The sporangia are thick-walled subspherical, varying in size, about 60-70 × 50μ. I have not succeeded in germinating these sporangia, the material I examined was sent in to the Royal Agricultural Society in August from N. Wales.

M. C. Potter describes the same disease sent to him from Cheshire in 1900. Journ. Board of Agric. IX. (1902), pp. 320-323, pl. 1.

There seems to be little doubt that it is the fungus described by Schilbersky, though no measurement or plates accompany his description.

Pythium ultimum Trow. Ann. Bot. XV. (1901), p. 300.

Hyphæ long, slender, much branched up to 1 c.m. in height and 6·5 to 1·7μ in width. Conidia chiefly terminal, spherical, varying from about 12 to 28μ in diameter, sometimes intercalary and barrel-shaped; oogonia terminal from 19·6 to 22·9μ in diameter, antheridia usually one to each oogonium, arising from the oogonial stalk, or in luxuriant cultures diclinous in origin; oospores one in each oogonium from 14·7 to 18·3μ in diameter, with a smooth, thick, yellowish epispore, germinating after a period of rest by one or more germ-tubes. Zoospores never developed.

Saprophytic on vegetable and animal substrata.

Syncephalis intermedia Van Tiegh. Ann. Sci. Nat., Ser. 6, Vol. I., p. 127, pl. 3.

On rabbit dung. Leith Hill, Surrey. Massee and Salmon. Ann. Bot. XVI. (1902), p. 77. figs. 23-26.

Circinella umbellata Van Tiegh and Le Mon. Ann. Sci. Nat., Ser. 5, Vol. XVII. (1873), p. 300, pl. 21, figs. 18-23.

On ostrich dung, and on cat dung, Kew. Mass. and Salm., l.c., p. 78.

Monilia candicans Sacc. Fung. novi vel. crit., No. 246.

Tufts floccose, from yellowish to white; sterile hyphæ creeping, fertile erect, sparingly septate, vaguely branched above, colourless; conidia catenulate, rising from small sterigmata on the branches, lemon-shaped, 15 × 9-10μ, subhyaline, faintly yellowish.

On rotten wood. Belmont, Hereford.

Monilia Koningi Oud. Arch. Neer. des Sci. Exact. et. Nat. VII. (1902), p. 287, Tab. 21.

Hyphæ colourless, 4-5μ thick, septate, creeping, dichotomously branched, fertile branches erect forming a raceme 30-40μ long, with a chain of up to 20 conidia at the tips; conidia subglobose apiculate, smooth 6-8μ in diameter, faint reddish-brown (avellaneo-roseis).

Grown in gelatine from pulverized humus, it forms orbicular, subzonate brownish tufts.

This is evidently the same fungus as one I grew several years ago on its natural matrix, decaying vegetation. In my specimen the fertile branches are nearly all subdivided into two or more of the fertile branchlets. If Oudemans' species were grown in more natural conditions the branching might be different. Some of his branches are divided as shown in the drawing.

Grown at South Kensington from material collected at Annan, Dumfriesshire.

Cephalosporium succineum. Mass. and Salm., l.c., p. 79, Fig. 34.

Forming very minute scattered patches on sheep's dung. Reigate.

Acremonium fimicolum. Mass. and Salm., l.c., p. 79, Fig. 92.

Forming snow-white tufts on rabbit dung. Kew.

Sepedonium niveum. Mass. and Salm., l.c., p. 80, Fig. 70.

On dung of red deer. Kew.

Oedocephalum ochraceum. Mass. and Salm., l.c., p. 80, Figs. 83-85.

On dung of rabbit. Kew.

Botrytis pilulifera Sacc. in Mich. II. (1880), p. 122.

Forming dense snow-white tufts on fowl's dung. Kew. Mass. and Salm., l.c., p. 81.

Botryosporium foecundissimum (Sacc. and March). Mass. and Salm., l.c., p. 81, Figs. 71-75.

On the dung of giraffe. Kew.

Aspergillus clavatus Desm. Ann. Sci. Nat., Ser. 2, Vol. II. (1834) p. 71.

On cardboard among dung. Kew. Massee and Salmon, l.c., p. 82.

A. niger Van Tiegh. Ann. Sci. Nat., Ser. 5, Vol. VIII., p. 240.

Sporophores often more than 1 mm. in length, 10-16μ thick, brownish, with a dark brown head of spores; spores globose 3·5-4·5μ in diameter, with more or less warted, violet-brown epispore.

On germinating seeds, Norwood, also on wax from the human ear, Kent.

This fungus seems to be unrecorded for Britain, though by no means rare. It has the branched sterigmata characteristic of *Sterigmatocystis*, but that genus has been sunk by recent systematists, who find that the branching is not constant even in one individual.

Rhizoctonia violacea Tul. Fungi Hypog., p. 188.

Underground sterile fungus investing tubers and roots with a dense violet mycelium, hyphæ branched, septate up to 10μ in width.

On mangolds sent to the Roy. Agri. Soc.

The mangold attached was kept in moist condition for some time, but no fruit was formed. The mycelial form is well-known on the Continent and in America. The life-history is not known.

Arthrobotrys superba Corda. Prachtfl., p. 43, pl. 21 (1839).

On dung of goat, Kew. On horse dung, Epping Forest. Mass. and Salmon, l.c., p. 83.

Trichothecium inaequale Mass. and Salm., l.c., p. 84, fig. 61.

On horse dung, Reigate. On rabbit dung, Kew. Forming a delicate effused bloom.

Trichosporium insigne Mass. and Salm., l.c., p. 85, fig. 33.

On pigeon dung, Kew.

Trichocladium asperum Harz. Bull. Soc. Imp. Nat., Moscow, XLIV. (1871), p. 125, Tab. 2. f. 1.

On rabbit dung, Kew.

Cercospora Melonis Cke. Journ. Board of Agric., IX., 1902, pp. 196-198, pl. 1.

On diseased cucumber leaves, sent to Kew for determination.

Sporodesmium piriforme Corda Icon. Fung. 1 (1837), p. 7, f. 116.

On rabbit dung, Mulgrave Woods, Yorkshire. Mass. and Salmon, l.c., p. 85.

Stysanus fimetarius (Karst.) Mass. and Salm., l.c., p. 86, fig. 62.

On the dung of Sinaitic Ibex and common camel. Kew.

On decaying vegetation. Belmont, Hereford.

The authors have given this fungus, described by Karsten as a variety of S. *Stemonitis*, specific rank. The specimen collected at Hereford shews exactly the same characters, rather blunt, dark-coloured spores, with very distinct warts. It is very different from *S. Stemonitis*.

Chaetostroma fimicolum Mass. and Salm., l.c., p. 87, figs. 67-68.

On rabbit dung. Reigate.

Graphium Comatrichoides Mass. and Salm., l.c., p. 88, figs. 89-91.

On dung of llama. Kew.

Gymnodochium fimicolum Mass. and Salm. (g. et sp. nov.), l.c., p. 89, figs. 49-51.

On dung of Ural wild sheep. Kew.

Ascodesmis Volutelloides Mass. and Salm., l.c., p. 61, figs. 13-17.

On dung of kangaroo. Kew.

Arachniotus citrinus Mass. and Salm., l.c., p. 62, figs. 86-88.

On dung of kangaroo. Kew.

A. candidus Schroet. in Cohn's Krypt. Fl. Schles. Bd. III., Haefte 2, (1893), p. 210.

On an old nest of a wild-bee and on the dung of the common roe. Kew. Mass. and Salm., l.c., p. 62.

Gymnoascus setosus Eidam, in Bot. Centralbl. X. (1882), p. 107.

On an old nest of a wild-bee. Kew. Mass. and Salm., l.c., p. 63.

Myxotrichum aeruginosum Mont. Ann. Sci. Nat., Ser. 2, Vol. VI. (1836), p. 34.

Syn. *M. ochraceum* B. and Br. Ann. and Mag. Nat. Hist., Ser. 4, Vol. XV. (1875), p. 37, No. 1475, pl. 1, f. 4. Mass. and Salm., l.c., p. 65, figs. 76-79.

M. spinosum Mass. and Salm., l.c., p. 64, figs. 63-66.

On dead branches of *Fraxinus.*

Ombrophila decolorans (Berk. and Curt.). Grevillea IV. (1876), p. 6. Redescribed by Massee. Trans. Linn. Soc. XXXI., pp. 466-7, pl. 18, figs. 23-4.

On decaying stump, Yorkshire. Crossland. Nat., Jan. 1902, p. 30.

Mollisia amenticola (Sacc.). Rehm, Rabh. Krypt. Flo. Disc., p. 540.

Apothecia gregarious, sessile, globose, then somewhat flat, the disc whitish yellow, brownish outside, becoming darker yellow when dry $\frac{2}{10}$-1 mm., soft and waxy; asci clavate-cylindrical, round above, 45-55 × 4-5μ, 8-spored; spores cylindrical obtuse, straight or slightly bent, one-celled 6-8 × 2-2·5μ colourless, bi-seriate; paraphyses thread-like; cells of the cup large and parenchymatous, yellowish, almost colourless towards the edge.

On female catkins of *Alnus glutinosa.* Yorkshire. Crossland. Nat., Jan. 1902, p. 29.

Sclerotinia Fuckeliana Fuck. Sym. Myc., p. 330.

Apothecia mostly solitary, growing from a finely warted sclerotium, 2-4 mm. long by 1-2·5mm. broad; disc at first globose and closed, then cup-shaped, becoming flat, with a delicate edge; the stalk cylindrical, straight or bent 2-10 mm. long by 1 mm. thick, smooth, brownish; asci cylindrical, rounded above, 100-120 × 9-12μ, 8-spored; spores elongate-elliptical, blunt, one-celled, guttulate, colourless, 9-11 × 5-6μ, paraphyses thread-like, septate, 5μ broad, colourless; tissue prosenchymatous, faintly brown.

On leaves of vine—causing disease.

Grown from sclerotia that were causing a disease on the stems of gooseberry bushes. Hereford.

Anixiopsis stercoraria Hans. Bot. Zeit. LV. (1897), p. 131, Taf. 11, fig. 8.

On owl castings, Kew. Mass. and Salm., l.c., p. 67, figs. 27-28.

Arachnomyces nitidus Mass. and Salm. (g. et sp. nov.), l.c., p. 68, figs. 127-131.

On decaying vegetation, Kew; Yorkshire, C. Crossland.
On dung of rat, Cheshire.

A. sulphureus Mass. and Salm., l.c., p. 68, figs. 55-60.

On an old nest of a wild-bee. Kew.

Magnusia nitida Sacc. Mich. I. (1878), p. 123. Mass. and Salm., l.c., p. 69, figs. 1-5.

On dung of Sinaitic Ibex. On rabbit dung, Reigate.

Chaetomium simile Mass and Salm., l.c., p. 71, figs. 8, 9.

On dog's dung, Kew.

C. crispatum Fuck. Sym. Myc., p. 90.

Perithecia gregarious, broadly elliptical about $\frac{1}{2}$ mm. in height; terminal hairs of two kinds, awl-shaped straight or slightly wavy, septate hyaline-brown; or of a cork-screw form, dark brown or almost black, and rough; asci cylindrical, shortly stalked, about $100 \times 10\mu$, 8-spored; spores broadly elliptical, pointed at both ends $12 \times 10\mu$, olive-brown.

On decaying hyacinth bulbs. Norwood.

C. bostrychoides Zopf. Sitzungsber. Bot. Ver. Brandenb. XIX. (1877), p. 173.

On dung of giraffe, burrhel wild sheep and mouse, Kew. Mass. and Salmon, l.c., p. 72. figs. 6, 7.

Sordaria bombardioides Auersw. Niessl. Beitr. zur Kenntniss der Pilze (1872), p. 37, Tab. VI., fig. 4.

On dung of llama, Kew. Mass and Salm., l.c., p. 73.

Delitschia insignis Mouton. Compt. rend. Bull. Soc. Roy. Bot. Belg. XXXVI. (1897), 2 part, p. 13, t. A., f. 8.

Perithecia globose, immersed, smooth, coriaceous $\frac{1}{2}$–$\frac{2}{3}$ mm. in diameter, ostiole rather long and stout, asci fusoid cylindrical, pedicellate, sporiferous parts $180\text{-}200\mu \times 30\mu$, stalks $30\text{-}50\mu$ long, paraphyses filiform, septate, longer than the asci; spores bi-seriate, oblong, round and obtuse at the apex, brown, constricted, 1-septate, the lower parts sometimes faintly septate, without a zone of mucous but bearing a fine hyaline appendage $40\text{-}60 \times 15\mu$.

On horse dung. E. S. Salmon, Epping Forest. Found originally on cow dung. Mass. & Salm. Ann. Bot. vol. XV., p. 344.

Fuligo ochracea Peck. Lister's Mon. Mycetozoa, p. 67.

On the stem of a withered plant of Pteris aquilina, The Horner Valley, Porlock, Somerset, 8th Nov., 1901, Mrs. A. Montague. This Myxomycete has only been found once before in Britain, viz.: at Aran Mawddwy, Merionethshire (see Journ. Bot. 1901, p. 84).

Amanita citrina Gonn. and Rab., Myc. Eur. (1869), t. 4.

On the bank of a stream, Epping Forest. George Massee. Essex Naturalist, 1902.

Lepiota clypeolaria Bull. var *alba* Bres. Fung. Trid., Vol. I., p. 15, pl. XVI.

Pileus 3-7 cm. broad, fleshy, convex, then expanded, broadly umbonate, silky; margin fibrillously flocculose, then squamulose; glabrous at the centre and becoming yellowish with age. Gills free, crowded 5-7 mm. broad, white then ochraceous. Stem 4-6 cm. long by 8-10 mm. thick; white, somewhat fuscous at the base, hollow, equal or attenuated downwards, white floccose and spotted yellow below the ring and often forming a spurious second ring, ultimately becoming glabrous. Ring distant, fugacious, white, floccose, submembranaceous, reflexed, striate above, yellowish floccose below. Flesh white, that of the stem somewhat yellowish. Spores obovate-oblong, rounded at the one end, apiculate at the other, one guttulate, white, hyaline 11-14 × 6-7μ. Edible.

On the ground, Norfolk. Dr. C. B. Plowright, 26th October, 1902. Castle Rising Heath.

Schulzeria grangei Eyre.

Pileus 1-1½ inches broad, dark green, cracking into fibrous scales on a white ground, flatly umbonate. Stem caespitose, squamose, squamules tipped with the same colour as the pileus. Gills widest in front, minutely denticulate. Spores club-shaped 11 × 5μ.

On soil among beech leaves, Nov. 1902. Swarraton, Rectory Wood, a parish on the estate of Lord Ashburton, The Grange, Hants. It comes next after *S. squamigera* Schulz. and Bres.

Inocybe Godeyi Gillet. Hym. de Fr., p. 517 (1874).

Yorkshire. Naturalist, Nov. 1902, p. 356.

Pholiota grandis Rea.

Pileus 20-30 cm. broad, fulvous tawny, convex then expanded and broadly gibbous, dry, covered with innate deep tawny squamules at the circumference which become revolute at the disc; flesh light yellow, 5 cm. thick at the centre. Stem 25-30 cm. long by 6-7 cm. thick, solid, fusiform, slightly squamulose and *tawny* below the ring, *deeply striate* for 5 cm. above. Ring distant, *almost fugacious*. Flesh *ferruginous*, light yellow at the apex and scissile in the centre. Gills *very broad* 1·5-2 cm. wide, attenuated in front, deeply *sinuato decurrent* behind, pallid then fuscous, somewhat crowded. Spores fuscous, oblong 6 × 3μ. Odour and taste very pleasant. Caespitose at the

base of an ash, St. John's, Worcester, 30th Oct., 1901. Mr. Carleton Rea. Intermediate in character between *P. squarrosa* and *P. spectabilis*, from which it is distinguished by its very large size which is always constant, by the scales of the pileus being less squarrose than the former but much more revolute than the latter, by the flesh of the stem being ferruginous, by the deeply striate apex of the stem and the tawny colour of the base, by the very broad sinuato-decurrent gills, by the almost fugacious ring, and by the size and shape of the spores. I have observed this species at Murthley Castle, Killerton, near Exeter, and other stations.

Galera spicula Lasch, n. 580. Fr. Hym. Eur., p. 268.

Pileus membranaceous, 5-15 mm. across, conico-campanulate then expanded, brown ochre, smooth, hygrophanous, striate when moist, flocculose when dry and atomate. Stem 2-3 cm. high by 2-3 mm. thick, hollow, thickened at the base, firm, white and *densely covered with white flocci*. Gills adnate, ventricose 1·5-2 mm. wide, ochraceous then cinnamon. Spores 6-8 × 4μ smooth, cinnamon.

On cocoa-nut fibre. Oakden, Kidderminster, 22nd Nov., 1902. Mr. D. P. Goodwin.

Easily distinguished from its allies by its smaller size and white floccose stem.

Coprinus Bresadolæ Schulz. Hedwigia Vol. 24 (1885), p. 136.

Yorkshire. Naturalist, Nov., 1902, p. 355.

Coprinus velox Godey. Gilléts Champ. France. Hym., p. 614, with fig.

On horse dung, Kew. Massee and Salmon, l.c., p. 61.

Hygrophorous bicolor B. & Br. Jour. Linn. Soc. XI. p. 565.

Yorkshire. Naturalist, Nov., 1902, p. 356.

Merulius Guillemoti Boud. Bull. Soc. Myc. de Fr., Vol. X., p. 63.

Pileus 18 cm. wide, 9 cm. deep, and 4-5 cm. thick, white, dimidiate, imbricated, smooth, becoming greyish with age. Flesh cinereous white, with fuscous zones. Hymenium gyrose, subgelatinous, fulvous, pulverulent with the spores. Spores oblong-ovate, ferruginous, 2-3 guttulate 10-11 × 5-6μ.

On a post of stand, Cricket Ground, Worcester, 6th June, 1902. Mr. Carleton Rea.

It is probable that this species has been overlooked and has been referred to *lachrymans*; it, however, is distinguished from the latter by the thick, well developed imbricate and dimidiate pileus, and by the larger spores containing 2-3 guttæ.

Clavaria subtilis Pers. Comm. t. 4, f. 2, Fr. Hym. Eur., p. 669.

Tough, thin, white, becoming yellowish, glabrous at the base, *of equal thickness throughout* (1 mm.), branches *few*, *dichotomously forked* and somewhat fastigiate. Spores white, elliptical $6 \times 3\mu$. The whole plant is 2-2½ cm. high.

Amongst grass, Moseley Green, Forest of Dean, 16th Sept., 1902. Mr. Carleton Rea. Distinguished from allied species by its small size, equality of thickness, toughness and few branches.

Clavaria Michelii Rea=Clavaria fragilis Holmsk. var. C. gracilis Pers. Fr. Hym. Eur., p. 675.

Fasciculate, very fragile, *thin*, *cylindrical*, yellow, white at the base, clubs 4-7 cm. high by 1-2 mm. thick, hollow, apex *acute*, spores white *subglobose* $3 \times 2\mu$.

On the ground under a cherry tree, Dinmore, 23rd Sept., 1902. Mr. Carleton Rea. Distinguished from C. fragilis by its thin cylindrical acute clubs and subglobose spores.

Clavaria striata Pers. Ic. et desc., t. 3, f. 5. Fr. Hym. Eur., p. 675.

Caespitose, *subfuliginous*. Clubs 3-5 cm. high by 3-4 mm. wide, attenuated at apex and base, extreme base white, somewhat twisted and *here and there striate*, compressed, stuffed white inside, then hollow. Spores white, subglobose and apiculate $3\text{-}4 \times 2\text{-}3\mu$.

Amongst grass, near Beeches, Forest of Dean, 16th Sept., 1902. Mrs. Carleton Rea. Distinguished by its subfuliginous colour and striate club.

Stereum quercinum Potter. Trans. English Arboricultural Socy., 1901-1902, p. 7.

Patches small, irregularly shaped, from $\frac{3}{16}$ of an inch in diameter, to ¾ of an inch long by ½ an inch wide, resupinate, coriaceous, and inconspicuous, fitting in between the crevices of the bark to which they are closely applied, and concave, with slightly raised edge, pale grey to pale brown, often with a lighter margin. Spores colourless, elliptical, with rounded ends, $8{\cdot}5 \times 4{\cdot}3\mu$.

On oak, Gosforth Park, near Newcastle-upon-Tyne, 7th Jan., 1899.

Lycoperdon velatum Vitt., t. 2, f. 3.

Pyriform or subglobose slightly umbonate, 7 cm. high by 4½ cm. wide, and with white cord-like mycelium at the base. The outer layer of the peridium tomentose, snow-white, breaking up into evanescent *star-shaped rosettes* and forming a false ring-like appearance at the apex of the sterile basal stratum, finally disappearing almost

completely. The inner layer of the peridium white, then of a *delicate flesh colour* and finally *greyish*, furfuraceous and furnished with very thin and short spines. Gleba white, then fulvous, and finally ash coloured. Sterile basal stratum white. Spores warted, globose 4-5μ yellow, threads of the capillitium 3-4μ thick.

Amongst leaves, Aldenham, Salop, 25th Oct., 1902. Mr. Carleton Rea. Distinguished from all the other British Lycoperdons by the outer layer of the peridium being as it were a universal veil, and by the delicate maiden's blush colour of the inner layer of the peridium when fresh.

Published 2nd March, 1903.

THE SAVERNAKE FOREST FORAY.

5th to 10th Oct., 1903.

The seventh annual week's Fungus Foray was held in Savernake Forest and the Ailesbury Arms Hotel, Marlborough was constituted the headquarters for the meeting. Here the members assembled on Monday the 5th of October, and in the evening in a spacious room that had been secured in the Hotel for the exclusive use of the members, some interesting specimens were already set out on exhibition on the plates. The President the Rev. W. L. W. Eyre, brought from Swarraton, some nice examples of *Lepiota lenticularis* (Lasch) which Fries erroneously places in the Amanitae and *Lycoperdon velatum* Vitt.,* sent a few days earlier to the Secretary. Mr. W. B. Allen exhibited from the neighbourhood of Broseley, *Lepiota carcharias* Pers., *L.acutesquamosa* Weinm., *Inocybe obscura* Pers., *Boletus variegatus* Swartz. *B. versipellis* Fr., and *Geaster rufescens* Pers., and from Wyre Forest *Trametes Bulliardi* Fr. and *Tremellodon gelatinosum* Scop., and Mrs. Carleton Rea placed on the plates from the vicinity of Perth, *Armillaria bulbigera* A. & S., *Pholiota aurea* Mattusch., *Inocybe lateritia* Weinm, *Trametes mollis*, (Sommerf.), *Sparassis crispa* Fr., *Clavaria Ardenia* Sow., *Cordyceps ophioglossoides* Fr., parasitic on *Elaphomyces variegatus* Vitt. and a mycetozoon that Mr. Arthur Lister next day identified as *Lepidoderma tigrinum* Rost.

On Tuesday, the 6th of October, a start was made from the Headquarters at 10 a.m. punctually, the members walking via the old Roman station of Cunetio into Savernake Forest, where they searched the portion that lies adjacent to the road that leads to the village of Savernake. Here they were rewarded with several interesting finds including *Pilacre faginea* B. & Br., *Hygrophorus metapodius* Fr., *H. fusco-albus* Fr., *Pholiota adiposa* Fr., *Cortinarius (Phlegmacium) emollitus* Fr., and *cristallinus* Fr., *Clavaria Krombholzii* Fr., *C. Kunzei* Fr., *C. luteoalba* Rea,† and a large patch some 18 inches or more across of the mycetozoon *Stemonitis fusca* Roth., var. *confluens* Lister. At the evening meeting, the Hon. Secretary had much pleasure in informing the members that he had now closed the list of foundation members, and that about seventy members still remained on the active list. Since his last report seventeen new members had joined the

* For description see Trans. Brit. Myc. Socy. vol. ii., p. 39, and Pl. 3 hereof.

† See p. 66, and Pl. 3.

Society, namely,— W. B. Allen, Benthall, Broseley; F. J. F. Barrington, Chapel Street, Kings Lynn; J. B. Carruthers, B. A. Government Mycologist and Assistant Director, Royal Botanic Gardens, Peradeniya, Ceylon; James Renny, Chepstow House, Southfields, London, S.W.; D. P. Goodwin, Oakden, Kidderminster; F. J. Rayner, Ivy Bank, Highfield, Southampton; Arthur D. Cotton, F. L. S., 33 Lowndes Street, London, S.W.; Alfred Adams M. A., M. B., Bridgend House, West Looe, Cornwall; Mrs. J. B. Robinson, Saint Mary's Lane, Louth; Mrs. Eliza A. Amphlett, Dalehurst, Bardwell Road, Oxford; Miss M. Claridge, 8 Park Terrace, Oxford; Arthur Lister, F. R. S., and Miss Gulielma Lister, Leytonstone; Miss May Grafton, Stoke Prior; James Clarke, Chapel House, Paisley; Miss Mary Miles, L. L. A., Laurel Bank, Bridgend, Perth; and Angus Grant, Drumälan, Drumnadrochit. They had to deplore the death of Mr. J. B. Robinson, who had done so much to elucidate the fungi in the neighbourhood of Louth, and he had also to report with regret the resignation of Professor F. W. Oliver, M. A., D. Sc. of University College, London. The Hon. Treasurer reported that the sum of £26 9s. 1d. was at that time standing to their credit at the Post Office, but from that must be deducted the cost of the programme of the present meeting £1, the hire of plates and room for exhibition of the fungi collected, and also the sum of fifteen shillings which had been received for subscriptions for the season 1904. The President then strongly pointed out the necessity of still contributing to the printing fund, and most kindly undertook, as his contribution thereto, to pay for one coloured plate* in the present number of the Transactions. The election of officers for the ensuing year was then proceeded with, Mr. Worthington G. Smith, F. L. S. was unanimously elected President; Professor H. Marshall Ward, D. Sc., F. R. S., &c., Vice-President; and Mr. Carleton Rea, B. C. L., M.A., Hon. Secretary and Treasurer. An invitation from the Committee of "The Haslemere Microscope and Natural History Society," to hold our annual foray for the season 1905, at Haslemere and Hindhead, was unanimously accepted. The members then considered several suggestions for the place of meeting next year, and as there was a general feeling that the convenience of our Northern members should be considered, it was unanimously resolved to fix upon Whitby as the centre, and to work the Mulgrave and Arncliffe woods from the 12th to the 19th of September 1904.

On Wednesday the 7th of October, the members were busy during the forenoon in determining the species collected on the previous day, and in placing the same on exhibition. A start was made about mid-day, the members proceeding along the Hungerford Road, and working that side of the Forest and on to a fir-plantation, where

* See Pl. v. and for description of Schulzeria Grangei Eyre, Trans. Brit. Myc. Socy. vol. ii. p. 37.

failing light compelled the members to desist from further search. The most interesting specimens collected included, *Lycoperdon velatum* Vitt., *Boletus pruinatus* Fr., *Lepiota seminuda* Lasch., *Mycena zephira* Fr., *Cortinarius (Phlegmacium) triumphans* Fr., *Eccilia carneogrisea* B. and Br., *Hygrophorus subradiatus* Fr. var. *lacmus* Fr., *Clavaria fumosa* Pers., *Tremellodon gelatinosum* Pers., and a mild tasting specimen of *Lactarius capsicum* Schulz. In the evening at the headquarters, Miss A. Lorrain Smith read an interesting note, on "*Gloeosporium Tiliae* a Disease of Lime Leaves" (see p. 55), and Mr. Carleton Rea, B.C.L., M. A., gave a paper entitled, "Notes on two Phalloideae new to Europe" (see p. 57).

On Thursday the 8th of October the members devoted the morning to investigating the previous days material, and then booked by the 1-30 train to Savernake Station. A few minutes walk soon brought them into the forest, and a traverse was then made via the Ailesbury Column and the Grand Avenue of beeches back to Marlborough. Great numbers of *Geoglossa* were noted as on the previous day, and a fair number of *Geaster fimbriatus* Fr. were collected, whilst the beeches throughout the forest were covered with large numbers of the destructive parasites, *Armillaria mucida* Schrad., *Pholiota adiposa* Fr. and *Pholiota squarrosa* Müll. The other specimens worthy of notice, included *Collybia hariolorum* D. C., *Collybia vertirugis* Cke., *Mycena elegans* Pers. and *Hydnum nodulosum* Fr. In the evening the Society's dinner was held at the Headquarters, and afterwards the President the Rev. W. L. W. Erye, delivered his address, entitled "Mycology as an instrument of recreation" (see p. 49). A hearty vote of thanks was then unanimously accorded to the Marquess of Ailesbury for his kind permission to visit Savernake Forest, and the Hon. Secretary was further directed to send to him a copy of their next Transactions, recording the result of the week's investigation.

On Friday the 9th of October the members drove from the Headquarters at mid-day, to the fir-plantation which had been only partially investigated on the Wednesday afternoon. Here Miss Gulielma Lister secured the somewhat rare mycetozoon *Licea flexuosa* Pers., and in the adjacent Forest, specimens of *Mycena rorida* Fr., *Eccilia griseorubella* Lasch., *Inocybe brunnea* Quél., *Naucoria scolecina* Fr. and *Merulius molluscus* Fr. were found. The return walk was then made to Marlborough by the principal entrance, some of the members taking advantage of Mr. J. W. Brooke's kind invitation to visit his very interesting private museum of Local antiquities on the way. Most of the members left Marlborough early on Saturday, the 10th of October, but one member added *Hygrophorus calyptraeformis* B. and Br. to the list before his departure. Over 450 species were collected during the foray, and Miss A. Lorrain Smith added a new North American mould *Helicomyces scandens* Morg. to the British Fungus Flora.

Complete List of Fungi gathered during the Foray.

Amanita mappa Fr., muscaria L., rubescens Pers.

Amanitopsis vaginata Bull., adnata W. G. Smith = junquillea Quél.

Lepiota procera Scop., rachodes Vitt., excoriata Schaeff., clypeolaria Bull., and var. pratensis Bull., cristata A. & S., erminea Fr., granulosa Bull., amianthina Scop., seminuda Lasch.

Armillaria mellea Fl. Dan., mucida Schrad.

Tricholoma sejunctum Sow., resplendens Fr., flavobrunneum Fr., albobrunneum Pers., rutilans Schaeff., terreum Schaeff., var. argyraceum Bull., saponaceum Fr., cuneifolium Fr., var. cinereorimosum Batsch., virgatum Fr., sulphureum Bull., album Schaeff., nudum Bull., panaeolum Fr., melaleucum Pers., var. polioleucum Fr.

Clitocybe nebularis Batsch., clavipes Pers., rivulosa Pers., cerussata Fr., phyllophila Fr., candicans Pers., maxima Fl. Wett., infundibuliformis Schaeff., geotropa Bull., inversa Scop., var. flaccida Sow., var. lobata Sow. metachroa Fr., ditopoda Fr., fragrans Sow.

Laccaria laccata Scop., var, amethystina Bolt., var. tortilis Bolt.

Collybia radicata Rehl., fusipes Bull., maculata A. & S., butyracea Bull., velutipes Curt., vertirugis Cke., stipitaria Fr., hariolorum D.C., confluens Pers., conigena Pers., tuberosa Bull., dryophila Bull., rancida Fr.

Mycena Iris Berk., elegans Pers., pura Pers., zephira Fr., lineata Bull., luteoalba Bolt., flavo-alba Fr., lactea Pers., rugosa Fr., galericulata Scop., polygramma Bull., alkalina Fr., ammoniaca Fr., peltata Fr., filopes Bull., sanguinolenta A. & S., galopoda Pers., epipterygia Scop., vulgaris Pers., rorida Fr., discopoda Lev., corticola Schum., capillaris Schum.

Omphalia pyxidata Bull., rustica Fr., fibula Bull., var. Swartzii Fr., integrella Pers.

Pleurotus dryinus Pers., ostreatus Jacq. var. columbinus Quél., applicatus Batsch.

Pluteus cervinus Schaeff.

Entoloma sinuatum Fr., lividum Bull., jubatum Fr., sericellum Fr., clypeatum Linn., costatum Fr., sericeum Bull., niderosum Fr.

Clitopilus prunulus Scop.

Leptonia lampropoda Fr., incana Fr.

Nolanea pascua Pers., mammosa Linn., pisciodora Ces., infula Fr.
Eccilia carneo-grisea B. & Br., griseo-rubella Lasch.
Claudopus variabilis Pers.
Pholiota squarrosa Müll., spectabilis Fr., adiposa Fr., mutabilis Schaeff., marginata Batsch.
Inocybe lanuginosa Bull., cincinnata Fr., pyriodora Pers., rimosa Bull., brunnea Quél., asterospora Quél., geophylla Sow.
Hebeloma fastibile Fr., glutinosum Lind., mesophaeum Fr., crustuliniforme Bull., var. minor Cke.=hiemale Bres.
Flammula carbonaria Fr., flavida Schaeff., inopoda Fr., sapinea Fr.
Naucoria melinoides Fr., scolecina Fr.
Galera tenera Schaeff., hypnorum Batsch.
Tubaria furfuracea Pers., crobula Fr.
Crepidotus mollis Schaeff.
Agaricus arvensis Schaeff., xanthodermus Gen., campestris Linn., silvicola Vitt., haemorrhoidarius Kalch.
Stropharia aeruginosa Curt., albo-cyanea Desm., inuncta Fr., merdaria Fr., semiglobata Batsch.
Hypholoma sublateritium Schaeff., capnoides Fr., fasciculare Huds., pyrotrichum Holmsk., velutinum Pers., appendiculatum Bull., hydrophilum Bull.
Psilocybe bullacea Bull., physaloides Bull., semilanceata Fr., foenisecii Pers.
Psathyra corrugis Pers., fibrillosa Pers.
Anellaria separata (Linn.).
Panaeolus phalaenarum Fr., campanulatus Linn.
Psathyrella gracilis Fr., atomata Fr., disseminata Fr.
Coprinus comatus Fr., atramentarius Fr., niveus Fr., micaceus Fr., lagopus Fr., radiatus Fr., ephemerus Fr., plicatilis Fr.
Bolbitius fragilis Fr.
Cortinarius (Phlegmacium) triumphans Fr., largus Fr., scaurus Fr., emollitus Fr., cristallinus Fr.
(Myxacium) elatior Fr., livido-ochraceus Berk., pluvius Fr.
(Inoloma) pholideus Fr.
(Dermocybe) caninus Fr., anomalus Fr., cinnamomeus Fr. and var. croceus Fr. and var. semisanguineus Fr.
(Telamonia) hinnuleus Fr., brunneus Fr., psammocephalus Fr., incisus Fr., iliopodius Fr., hemitrichus Fr., paleaceus Fr.
(Hygrocybe) subferrugineus Fr., castaneus Fr., leucopus Fr., erythrinus Fr., decipiens Fr., acutus Fr.
Gomphidius glutinosus Fr., viscidus Fr.

Paxillus involutus Fr.

Hygrophorus fusco-albus Fr., pratensis Fr., virgineus Fr., and var. roseipes Mass., niveus Fr., russo-coriaceus B. & Br., metapodius Fr., subradiatus Fr. var. lacmus Fr., laetus Fr., ceraceus Fr., coccineus Fr., miniatus Fr., puniceus Fr., obrusseus Fr., conicus Fr., calyptraeformis B. & Br., chlorophanus Fr., psittacinus Fr., unguinosus Fr., nitratus Fr.

Lactarius torminosus Fr., turpis Fr., pubescens Fr., insulsus Fr., blennius Fr., chrysorheus Fr., capsicum Schulz., vellereus Fr., deliciosus Fr., pallidus Fr., quietus Fr., aurantiacus Fl.D., rufus Fr., glyciosmus Fr., fuliginosus Fr., serifluus Fr., mitissimus Fr., subdulcis Fr.

Russula nigricans Fr., adusta Fr., chloroides (Kromb) Bres., furcata Fr., depallens Fr., lepida Fr., vesca Fr., cyanoxantha Fr., foetens Fr., fellea Fr., emetica Fr., ochroleuca Fr., fragilis Fr., var. nivea Cke., var violacea Quél., integra Fr., puellaris Fr., lutea Cke.

Cantharellus cibarius Fr., tubaeformis Fr.

Marasmius peronatus Fr., oreades Fr., erythropus Fr., ramealis Fr., rotula Fr., androsaceus Fr., epiphyllus Fr.

Panus stipticus Fr.

Lenzites betulina Fr.

Boletus elegans Schum., flavus With., granulatus Linn., badius Fr., piperatus Bull., chrysenteron Fr., subtomentosus Linn., radicans Pers., pruinatus Fr., fragrans Vitt., laricinus Berk., scaber Fr.

Fistulina hepatica Fr.

Polyporus rufescens Fr., squamosus Fr., intybaceus Fr., giganteus Fr., dryadeus Fr., betulinus Fr., adustus Fr., chioneus Fr., caesius Fr., lacteus Fr., fragilis Fr.

Fomes lucidus Fr., fomentarius Fr., annosus Fr., applanatus Wallr., ferruginosus Mass.

Polystictus versicolor Fr., abietinus Fr., radiatus Fr.

Poria vaporaria Fr., mollusca Fr., terrestris Fr., umbrina Fr.

Daedalea quercina Pers.

Merulius tremellosus Schrad., molluscus Fr.

Hydnum repandum Linn., nodulosum Fr., farinaceum Fr.

Tremellodon gelatinosum Pers.

Irpex obliquus Schrad.

Grandinia granulosa Fr.

Craterellus cornucopioides Pers.

Thelephora terrestris Ehrb., laciniata Pers.

Stereum ochroleucum Fr., purpureum Pers., hirsutum Fr., sanguinolentum Fr., rugosum Fr.

Hymenochaete rubiginosa Lév.

Corticium calceum Fr., nudum Fr.

Peniophora quercina Cke., cinerea Cke.
Coniophora puteana Mass.
Auricularia mesenterica Fr.
Clavaria muscoides Linn., fastigiata Linn., cinerea Bull., cristata Pers., rugosa Bull., Krombholzii Fr., Kunzei Fr., abietina Pers., flaccida Fr., fusiformis Sow., inaequalis Fl. Dan., luteoalba Rea, vermicularis Scop., fragilis Fr., fumosa Pers.
Calocera viscosa Fr., stricta Fr.
Pistillaria puberula Berk.
Tremella mesenterica Retz., albida Huds., sarcoides Sm.
Hirneola auricula—Judae Berk.
Dachrymyces deliquescens Dub., stillatus Nees.
Pilacre faginea B. & Br.
Scleroderma vulgare Fr. verrucosum Pers.
Crucibulum vulgare Tul.
Sphaerobolus stellatus Tode.
Lycoperdon velatum Vitt., excipuliforme Scop., saccatum Vahl., gemmatum Batsch, pyriforme Schaeff., perlatum Pers., plumbea Pers., nigrescens Vitt.
Geaster fimbriatus Fr., rufescens Pers.
Ithyphallus impudicus Fisch.
Mutinus caninus Fr.
Monilia candicans Sacc.
Oedocephalum glomerulosum Sacc.
Rhinotrichum Thwaitesii B. & Br.
Botrytis cinerea Pers.
Mucrosporium sphaerocephalum Sacc.
Helicomyces scandens Morg.
Torula herbarum Link.
Hormiscium hysterioides Sacc.
Periconia pycnospora Fres.
Stachylidium cyclosporum Grove.
Thyrsidium botryosporium Mont.
Pestalozzia lignicola Cke.
Spinellus fusiger Van Tiegh.
Ascomyces turgidus Phil.
Hypocrea rufa Pers.
Diatrype stigma Hoffm.
Hypoxylon fuscum Pers.
Ustulina vulgaris Tul.
Xylaria hypoxylon Linn.
Rhytisma acerinum Fr.
Propolis faginea Karst.
Bulgaria polymorpha Wett.
Coryne sarcoides Tul.
Ascobolus furfuraceus Pers.

Mollisia cinerea Karst.
Helotium claro-flavum Berk., citrinum Fr., virgultorum Karst., var. fructigenum Rehm.
Ciboria ochroleuca (Bolt.)
Chlorosplenium aeruginosum De Not.
Lachnea scutellata Gillet.
Dasyscypha virginea Fckl., nivea Mass., calycina Fckl., hyalina Mass.
Humaria omphalodes Mass., granulata Sacc.
Peziza succosa Berk.
Otidea aurantia Mass.
Helvella crispa Fr., elastica Bull.
Leotia lubrica Pers., acicularis Pers.
Geoglossum viscosum Pers., glabrum Pers., hirsutum Pers.

*Mycetozoa.**

Ceratiomyxa mucida Schroet.
Physarum nutans β & γ Pers., viride Pers.
Fuligo septica Gmel.
Craterium pedunculatum Trent.
Chondrioderma spumarioides Rost.
Didymium effusum Link.
Stemonitis fusca α & γ confluens Roth.
Comatricha obtusata Preuss., typhoides Rost.
Lamproderma irideum Rost.
Cribraria argillacea Pers.
Licea flexuosa Pers.
Trichia scabra Rost., varia Pers., fallax Pers.
Arcyria cinerea Pers., punicea Pers., incarnata Pers.
Lycogala miniatum Pers.

* This list was kindly determined by Miss G. and Mr. A. Lister, F.R.S.

MYCOLOGY AS AN INSTRUMENT OF RECREATION.

PRESIDENTIAL ADDRESS.

By Rev. William L. W. Eyre, M.A.

Ladies and Gentlemen,

In times past we have had the privilege of hearing or reading the words of those whose great abilities I cannot emulate. The intricacies of the *Uredineæ* are beyond me, the methods of a University laboratory exceed any efforts that can be practised in a country Rectory, still, as expected to offer a contribution to advance our common aim, I offer the following. Thirty years ago, Dr. M. C. Cooke, whose life-long perseverance and generous assistance we all, in one way or another, gratefully acknowledge, gave an address on similar lines to the present. Following his lead, I feel in safe hands.

If by any method we can popularise our special study, we may hope to increase the membership of the Society, perhaps prove a sufficiently strong attraction for some to join us who are only deterred from co-operating because we are reputed to be *too scientific*.

It is often well to review our pleasures, and if we recognise our department of Nature's field as at any rate recreative, my remarks may prove a not entirely unsuitable topic for this evening. I turn then to my subject.

Of late years there has been much comment made in our newspapers about the excessive recreation of the English people. One Bishop certainly has lifted up his voice of warning lest recreation destroy the sense of duty, and the holiday side of life be thrust too much into the forefront. Possibly such a caution may be needed, but the recreation which the study of Mycology affords is free from some aspects of the pleasure which the Bishop infers may be carried to excess. In my own neighbourhood the question has been asked, What do you get out of it? From the study of Mycology I am quite as convinced as Dr. Cooke we may secure several things, from our love of Fungi emerge ideas and thoughts of real value. We note differences, we learn to distinguish. Sports train the hand, the foot. There is an education of sense, of nerve, of muscle. The growing passion for them in our time is Nature's set-off to the lowering of vitality which town life and sedentary toil are bringing upon civilized peoples. But says another

public print, sport of all kinds is being abused. We seem incapable, as a people, to steer a middle course in anything. A fashion becomes a craze, a craze developes into a mania. Many never reach beyond the knowledge of the *odds* on a race, the *form* of a footballer, or the *centuries* of a cricketer.

Mycology may here have its part to do. There are many forms of recreation. Ours may be no better than the rest. The amusement and pleasure that suits one person may not suit another. Those who educate themselves in the love of things, either in the animate or inanimate world, need not import envy or greed into a necessity that lies upon us. We all of us require some recreation; the only point is as to its form, and not to allow it to increase upon us so much as to deaden, as the Bishop rightly says, the sense of duty. If life is all play and pastime there is a sad desecration of noble gifts. Ruskin maintains "that the greatest thing a human soul ever does in this world is to see something and tell what it saw in a plain way." We would then look at our study as recreative, for, consider: The study obliges us to make close observation, the numerous forms of Fungi demand attention and skill to detect the minute differences discernible among them. The eye requires tuition, seeing must be cultivated; fortunate the man who is by Nature endowed with the power to see and to appreciate. The capacity of vision increases by practice. When the learner has grasped the language in which, for instance, the parts of the mushroom are described, he may go on to the next specimen he falls in with, if some friend will tell him the name of the species to which his attention has been drawn, he goes with rekindled ardour to hunt it down in his volume of Cooke, Massee, or Stevenson. His vision is expanding; he begins to see sufficiently clearly to work on without dismay or disappointment. It is the earlier steps of any true knowledge of nature that are the most difficult, technical language, and it cannot be altogether avoided, is a hindrance; but patience and renewed effort will conquer this as well as other things. In all walks of life an intelligent and educated eye is of service. It is a serious mistake to allow the power of observation to fall into atrophy from want of use.

In the field of medicine, surgery, and physical science additions are being made continually to the sum of human knowledge. Novelty attends the Mycologist; throughout his career he is always learning. Was there ever a student of Fungi who could not recall something this year that he had passed unnoticed before? Your experience is probably similar to mine, each season reveals some fresh species. It may be new to the scientific world of Europe or America, an addition to the local list which we have been interested in making; forms appear

of which the student says to himself, "How strange that I should have overlooked this hitherto." Sometimes it happens that this particular species comes to be considered as new, not because it is really *new*, but unobserved, owing to its uncertain appearance, the causes of which lie hidden. We remember how abundantly mushrooms prevailed in the autumn of 1901 and were exceedingly scarce in the following year. Novelty is ever with us, and it is a strong point in our method of recreation. Pleasures repeated too often lose their zest, but Fungi never fail to please those who study them. Enjoyment comes and there is no limitation to the enjoyment. If the mind is devoted to classification here is occupation indeed; there are hundreds, even thousands, to arrange in some definite order. Is it the life history, or the geographical distribution, or the chemical constitution? There are prizes to be won; the field is wide and free. Have we any skill with the pencil or brush? For the artist there is an almost endless charm in the effort to copy the forms and tints displayed before us. What more elegant than the marks distinguishing the *Cortinarii?* It is an advantage to the novice in these matters that at the annual meeting he may see these objects in great variety and already named for him. He may often also witness the objects themselves being drawn and coloured by some of our members; if he chooses to make enquiry he will find those ready to satisfy him with courtesy and kindness. For him at least there is a minimum of trouble and he may soon learn what the language of his books have failed to impart.

Our method of recreation takes us out into the open air, clears our mind of the dust and cobwebs of too close an application to an absorbing occupation or professional business. If illness overtake us the time of convalescence may be brightened, the tediousness of a slow recovery be shortened by the study of some special group, *Spherias*, *Peziza*, or the *Mycetozoa* Specimens often lie close at hand and are easily accessible. Friends and relatives are only too glad to look for them and enable us to bring them into the field of the microscope. The water-butt at the back door, the leaves and twigs lying about, will afford occupation for many days. When strength returns we prosecute our favourite recreation with renewed enjoyment. There is a vast area before us, atmosphere as well as land, waiting to be explored. The knowledge we already possess, much of it recorded in our literature, soon requires supplementing or revising. Mr. Biffin pointed out to us last year a species having more than one kind of fruit, and this law, of which we knew something previously, seems likely to gain a much wider extension.

How little do we know at present of the meaning of the various odours that we detect in certain species? Even the definition of it is not always easy; there is an appeal to us which we cannot satisfy. When we attempt to describe (from association with something else that we have recognised), then we find our limitations. It seems possible that there may be as wide a range in odour as there is in colour, but man's sense of smell is so imperfect he cannot go much beyond the statement of pleasant or nauseous, spicy or nitrous.

The arrangement of an Annual Meeting, the details so carefully worked out by our Secretary, takes us into unfamiliar parts of our common country. If we are not all lovers of Fungi we enjoy the pleasure of seeing new places, towns and woodlands, which we should have had no necessity to visit without a definite object. We should hardly have been persuaded to undertake a trip to Ireland or Scotland without some settled purpose. We should have remained quietly at home.

Our need, however, of recreation has tempted us to emerge into the open. Thus we become associated with others, a spirit of cordiality is generated, healthy emulation arises amongst us, we resume our avocations with body and mind refreshed. The particular form of our recreation stimulates to further effort to know and learn more. Our ability in our respective callings is in no way lessened, but rather increased, by our method of taking holiday. I think we can agree to the statement that has been made, There is quite enough work to be done within the compass of a single parish to keep a man's mind fresh and vigorous and to give him a chance of contributing something to the world's knowledge.

The study of Fungi, as it unfolds before us, presents objects of marvellous beauty, and through this method of recreative pleasure, it holds, I venture to think, a high position. There is a beauty of colour, of exquisite workmanship, of graceful form, that offers some of the purest enjoyment that the mind can reflect upon.

"To the attentive eye," says the American Emerson, "each moment of the year has its own beauty, and in the same field it beholds every hour a picture that was never seen before and shall never see again. The heavens change every moment and reflect their glory or gloom on the plains beneath."

The beauty we so often behold among the Fungi is very fugitive, but most striking in its manifestation, it may be visible in a cluster of say scores, of *Craterium* cups growing on a half-buried fir chip, scarlet and orange in shades of remarkable elegance, hidden often from the casual eye till turned upwards to the light of day. We have, too, the vivid tints of red in the *Russulæ* of violet or blue which we associate with the *Leptonias* or the

snowy whiteness of some of the *Hygrophori.* Abundant objects are provided for us, giving rise to the deepest thought. What is the meaning of the odours of *Clitocybe fragrans*, *Nolanea pisciodora*, *Mycena pura*, or that most pungent and peculiar of all the *Truffle.* Through what secret chemistry is it brought about? To whom? or to what end are these things of beauty and fragrance reserved? There are problems here for the acutest and ablest mind to ponder. A person must be indeed careless who is not sometimes compelled to ask whence come these forms, colours, and odours. So exquisite, yet so frail and fleeting. So full of marvel and yet so long unknown ; still too little recognized by thousands who tread them underfoot. The heart and intellect may profitably expand under such genial influences. Their beauty and interest can be no chance endowment. It is God's hall mark attesting that the works are His. The before-mentioned Emerson says, " Beauty takes us out of surfaces to thinking of the foundation of things," or, the German Goethe, " the beautiful is the manifestation of the secret laws of Nature, but for this appearance had been for ever concealed from us." There is the gratification then to the reverential and humble soul that he is lifted by this method of recreation to a higher plane. Our knowledge of Fungi, as it increases, will be an additional evidence of the manifold wisdom that embraces us.

While forms come and go they show us something of the invisible energy that surrounds us. We gaze upon the unceasing work of our Creator. We bow the knee to gather our specimens in the presence of the King of Glory.

Syllabus 1. Close observation necessary—the eye to be trained.

2. Increase of human knowledge, novelty in the pursuit.

3. An open-air recreation—change of scene often beneficial to mind and body.

4. We realize a sense of Divine beauty in a world of unnoticed things.

ON THE OCCURRENCE OF ECHINOSTELIUM MINUTUM DE BARY, NEAR HEREFORD.

By G. & Arthur Lister, F.R.S.

When the British Mycological Society met at Hereford in the autumn of 1902 to study the fungi of that district, Miss A. L. Smith put aside a part of the material collected, for further examination in London. Fragments of decaying vegetable matter were placed in a cultivating chamber at the British Museum, Nat. Hist. From this material there arose a scattered growth of extremely minute, Mucor-like bodies, scarcely visible without the aid of a lens. Under the microscope they showed a globular head, principally composed of spherical colourless spores, supported on a slender, colourless stalk. After some unsuccessful attempts to germinate the spores, Miss Smith made a glycerine mounting of the specimen, which she kindly submitted to us last autumn. It consists of about twelve sporangia of *Echinostelium minutum* de Bary dispersed over a small fragment of dark vegetable substance. No unbroken heads remain in the preparation, but they appear to have measured about 50 μ in diameter. The stalk consists of a delicate hyaline membrane, enclosing almost colourless granular refuse matter; it is about 0.5 mm. in length, 25 μ broad at the base, gradually tapering to 2 μ at the apex; it is continued into the sporangium as a short columella 3 μ to 5 μ long, from which there springs a scanty colourless capillitium; this consists of two or three main threads branching in a zigzag manner, sparingly anastomosing above and provided with many free, spine-like branchlets. At the base of the columella, in most of the sporangia, two to four globose colourless spores, 6 μ diam., remain attached, precisely as figured by Rostafinski in his excellent drawing reproduced in Cooke's Myxomycetes of Great Britain, fig. 54. The life history and the character of the plasmodium are at present obscure, but the species appears to be rightly placed by Rostafinski among the Mycetozoa in the division *Stemonitaceæ;* it would seem to be most nearly allied to *Clastoderma Debaryanum* Blytt. This is, we believe, the first record of *Echinostelium minutum* having been obtained in Britain.

Highcliff, Lyme Regis, January 26, 1904.

DISEASES OF PLANTS DUE TO FUNGI.

By A. Lorrain Smith.

GLOEOSPORIUM TILIAE OUD.

An instance of loss caused by this fungus was brought under my notice in June of this year. The leaves of some lime trees in Oxfordshire were stripped from the branches in large numbers during a gale of wind. There had been severe cold and frost, which might have injured the leaves; and there had been a hail-storm, which had undoubtedly torn and injured the foliage. These factors, however, did not seem sufficient to account for the damage done, especially as the leaves when they fell were at their fullest vitality. The owner of the trees had noticed black patches on some of the leaves and, on the petioles of those that had fallen, a small burnt-like spot was nearly always present at the point of rupture.

Microscopic examination shewed that the blackened areas were due to the death and discolouration of the cells of the cortex, and on these were seated the small pustules of a *Gloeosporium*, a fungus belonging to the Melanconieae group of *Fungi imperfecti*. The injury in some cases had not gone any deeper than the superficial layers of the cortex, in others the mycelium had penetrated to the bundle strand and corroded half-way through the tissue of the stalk. The damage done to the conducting tissue was in no case sufficient to kill the leaf or to sever its connection with the branch, but the weakened petiole was no longer able to resist the force of any strain, and the wind had been the final agent of destruction.

The spots on the leaves were also caused by the same fungus. They were characterized by a central grey portion, visible on both surfaces, the decolouration being caused by the parasite having destroyed the contents of the cells; the *Gloeosporium* pustules looked like tiny blisters scattered over the discoloured spots: a dark line surrounded each patch.

Gloeosporium, like other Melanconieae, does not form a definite fruiting body. The one-celled spores are borne at the tips of short upright hyphae, which rise from a compacted base of fungal hyphae, localized in little masses and formed under the epidermis of the host plant. The swelling of the epidermis, which bursts at a definite central point to allow the escape of the spores, gives, however, more or less the appearance of a perithecium. The size of the spores found on the Oxfordshire specimens varies very much. They measure about 10 $\mu \times 2\frac{1}{2}\ \mu$, some being much smaller. It has been recorded from Holland, Italy and Australia, but only on the blade of the leaf, where it

is comparatively harmless. A similar fungus appears on the young shoots, leaves and fruits of the vine, causing extensive damage. Another, Gl. nervisequium, attacks the leaves of the Plane; the mycelium passes down the veins into the petiole, and results there also in the fall of the leaf, but in a slightly different way, as no pustules appear on the leaf stalk.

SEPTORIA FRAGARIAE.

This fungus, one of the Sphaeropsideae, also in the group of "*Fungi imperfecti*," is recorded on the leaves of *Fragaria* and other allied plants. It occurs on brown spots, the perithecia are very minute and open by a wide pore. A cultivated strawberry was brought to me as one of a crop that had been very much damaged and rendered unfit for market. I had no leaves to examine, but the bracts were covered with the perithecia of the fungus. The strawberry itself was ripe and well formed, but here and there all over it were withered spots. The seeds were very hard and the tissue all round dried and juiceless. Perithecia of *Septoria* were found there also and were undoubtedly the cause of the injury to the fruit. There was a rich growth of mycelium in the cells beneath the damaged spots. The spores are elongate-cylindrical, 3-septate and colourless, and measure about 35 μ × 4 μ. There is no size recorded in the published description. There is no record that I can find of the fungus having passed from the leaves to the fruit. The fruits came from a grower near Southampton, but I was unable to get sufficient material to carry out a more complete investigation.

NOTES ON FUNGI RECENTLY COLLECTED.

By A. Lorrain Smith.

Gonytrichum caesium Nees. This somewhat rare fungus was collected in the Autumn on sticks in a Dumfriesshire wood. In several details it differs from the published and figured specimens and yet is so near akin that it is evidently the same species. The brown filaments are intricately branched, tapering and colourless at the tips about 2·5 μ in diameter; a few septa are faintly visible. The conidiophores are bottle-shaped up to 8 μ in length by 3 μ at the widest part, and they cluster round the nodes and at intervals along the branches. The swelling at the nodes is barely perceptible, or altogether absent. The globose

head of spores is about 4 μ in diameter; the spores are oblong and extremely minute, about 2·5 μ in length.

Rhinotrichum Thwaitesii B. & Br. This fungus was found in great abundance on dead leaves at Savernake. The conidiophores grew in coremium-like tufts. The stalk hyphae, closely compacted, were septate 6·7 μ in width. Towards the top of the tuft they branched and spread out in a loose, fluffy manner. The tips of the branches were clavate, about 12 μ in width, very delicate in texture and studded with sessile echinulate, globose spores 5 μ in diameter. The whole plant was white, changing to a rosy, brick-red shade.

Oedocephalum glomerulosum Sacc., usually recorded on dung, was found growing on rotten wood.

NOTES ON TWO PHALLOIDEAE NEW TO EUROPE.

By Carleton Rea, B.C.L., M.A., &c.

WITH PLATE III.

The Phalloideae chiefly inhabit the tropical and sub-tropical regions of the world, and out of about 75 species described up to the present time only eight have been recorded as European. These are, *Ithyphallus impudicus* Fisch., I*thyphallus imperialis* Kalch., *Mutinus caninus* Fr., *Mutinus bambusinus* Fisch., *Clathrus cancellatus* Tournef., *Colus hirudinosus* Cav. & Séch., *Anthurus borealis* Burt variety *Klitzingii* P. Henn and *Aseroe rubra* La Billard. The British list only includes five species, viz., *Ithyphallus impudicus*, *Mutinus caninus*, *Mutinus bambusinus*, *Clathrus cancellatus* and *Aseroe rubra*. To these I have now the pleasure of adding *Lysurus australiensis* Cke. & Mass., which was brought to me by our fellow-member, Mr. D. P. Goodwin, on the 14th of November, 1902, who discovered it in a pasture field adjacent to his flour mill at Kidderminster, Worcestershire, near to a spot where the refuse and dirt had been emptied out of the empty sacks which had probably contained Australian wheat.

The genus *Lysurus* Fr. Syst. Myc. II. p. 285 is thus defined by Cooke in his Handbook of Australian Fungi, and is practically the same as is adopted by both E. Fischer in his Phalloideen and Saccardo in his Sylloge: "Receptacle stipitate, divided above in vertical lobes, free at the apex, *distinct from the stem.* Sporiferous pulp on the interior of the lobes." And at p. 216 of the Handbook of Australian Fungi the *Lysurus australiensis* Cke. & Mass. Grev. vol. xviii. is also given as a synonym for *Mutinus sulcatus* Cke. & Mass. described in Grev. vol. xvii. The description there given is, "Receptacle 2-3 cm.

long, tawny, for the most part five-lobed; lobes attenuated upwards, at first connivent, then somewhat reflexed, with a longitudinal depression along the middle, transversely rugose. Stem cylindrical, 10-12 cm. long, nearly 2 cm. thick, hollow, cellular, whitish. Volva globose, torn in lobes, white. Pulp rufous brown, becoming blackish. Spores 3×1 μ. On the ground, Queensland."

I think the above description well accords with the following notes which I drew up at the time, and as I hold the opinion that every plant added to the British list should be fully described by the recorder so that botanists may be enabled to judge what variation (if any) there be in the plants found on British soil. Stem cylindrical, 6 cm. long, 2 cm. wide, but attenuated at the base within the volva to 1 cm., whitish, hollow, net-celled, divided at the apex into six arms, Arms deep rich reddish brown, 15-20 mm. long, 5-8 mm. wide at the base, attenuated at the apex, longitudinally one-grooved down the centre and transversely cross-ribbed, erect, slightly incurved at the apex, hollow except at the extreme apex, not net-celled, but of a different texture to the flesh of the stem. Volva 4 cm. wide, white, irregularly torn, and with white strands of mycelium all round the base. Spores reddish brown, $3 \times 1{\cdot}5$ μ.

The whole plant at first sight looks like a Sea Anemone with its reddish brown tentacles and whitish stem seated in the volva of an ordinary *Amanita phalloides*.

It is a curious fact that in August of last year Klitzing at Ludwigslust, Mecklenburg, Germany, found a variety of an American phalloid growing in a field of asparagus, which is described in Beiblatt zur "Hedwigia" Band xli., 1902, pp. 167-174, as follows:— "*Anthurus borealis* Burt variety *Klitzingii* P. Henn. Mycelium filiform or root-like, branched, white; exoperidium at first subglobose, then ovoidellipsoid, 3 cm. long, $2\frac{1}{2}$ cm. wide. Volva white on the exterior, papyraceous, middle layer gelatinous, inner layer membranaceous, white longitudinally striate, irregularly lobed. Stem clavate. attenuated at the base, 2 cm. wide at the apex, 2-$7\frac{1}{2}$ cm. long, quite hollow inside, whitish outside, net-celled, wall at base of 1-2 layers higher up of 3 layers, a thickened ring at the apex which is divided into 5-7 narrow lanceolate arms; arms with a longitudinal furrow down the middle which is naked, white and sub-silky, but everywhere, except at the base, on the inside transversely rugose, whitish, clothed with the chestnut mass of spores, then free, separate, erect, apex obtuse or subacute, $1\text{-}2{\cdot}8 \times 0{\cdot}4\text{-}0{\cdot}5$ cm. Basidia oblong, clavate, continuous; spores 5-8 ellipsoid, subfusoid, light green, $3{\cdot}5\text{-}4 \times 1{\cdot}5\text{-}2$ μ. Anthurus borealis is described as light flesh coloured, the spore masses olive green; the variety is never olive green."

Now the genus *Anthurus* Kalch Grev. ix. p. 2 is defined by Cooke and the same authorities I cited for Lysurus as having the receptacle stipitate, or with a very short stem, divided above into erect patent

E. A. Rea del. West, Newman chromo London.

A. Lysurus australiensis *Cke & Mass.* B. Clavaria luteoalba *Rea.*
C. Lycoperdon velatum *Vitt.*

laciniae, free at the apices, but *running down direct into the stem and not distinct from it.* The leading feature of distinction between these closely-allied genera, then, seems to be that in *Anthurus* the flesh of the stem passes unchanged into the arms, whereas in *Lysurus* the flesh of the arms is of a different character to that of the stem. If this be the correct distinction between these two genera, then I am bound to say that I feel compelled, both by the description and the plate issued therewith, to consider this German species as rather appertaining to *Lysurus* than *Anthurus.*

As these notes are dealing with the Phalloideae, I feel you will permit me a digression in drawing your attention to *Phallus imperialis* Kalch. This species I had the privilege of seeing in some numbers in the vicinity of Malesherbes in France, on the 14th and 15th of October in last year. It is very similar to *Phallus impudicus*, but is characterized by the exterior of the volva, being rose colour, the light blue strands of mycelium at the base of the volva, the orbicular disc at the summit of the pileus which is generally delicately crenate, and absence of any distasteful smell.

I personally noticed no appreciable scent even after the specimens had been boxed and then on opening the receptacle in which they had been contained, but I heard the French mycologists describe it as *odeur d'eglise.* This expression I was in doubt of as to their meaning. Did they refer to the damp, earthy smell we meet with in some of our churches on Sunday, or was it that of spent incense? I have drawn your attention to this species because I think we have probably overlooked its occurrence in Britain; and I recommend all our members who have the opportunity of working pine woods in a calcareous, sandy soil to add this Phalloid to our list.

FUNGI NEW TO BRITAIN.

By Annie Lorrain Smith and Carleton Rea, B.C.L., M.A., &c.

WITH PLATES III., IV. & V.

Phellomyces sclerotiophorus Frank.

Found by Prof. T. Johnson on potato-tubers from various parts of Ireland. Econ. Proc. Roy. Dubl. Soc. I. 1903, pp. 161-165.

Resticularia nodosa Dangeard. Recherches histologiques sur les Champignons. Le Botaniste 2nd sér. 1890-1, pp. 96-9, pl. 4, figs. 24-31.

Growing on rocks in the *Nepenthes* house at Kew, Oct., 1902. F. E. Fritsch. Ann. Bot. XVII., 1903, p. 650.

R. Boodlei Fritsch. l. c., p. 654.

In the filaments of a Tolypothrix in a pond, Richmond Park.

Gloeosporium Tiliae Oud.*

On the leaves and petioles of the lime, Oxfordshire, June, 1903.

Oedocephalum clavatum A. L. Sm. Jour. Bot. XLI. (1903), p. 259, pl. 454, figs. 11 and 12.

On a laboratory culture of a hyacinth root, Norwood.

Helicomyces scandens Morg. North Am. Helicosporeae. Cincinn. Soc. of Nat. Hist. XV. (1892), p. 42.

Effused, forming a rose-coloured setulose stratum. Hyphae climbing, hyaline, septate, branched, bearing the spores in dense clusters on minute lateral teeth; spores linear, hyaline, sometimes guttulate, faintly multiseptate, coiled 3-4 times, the thread 150-200 μ in length, 2·5-3 μ thick, the inner extremity acute, the outer obtuse.

Growing on old wood and bark, A.L.S.

The specimen that grew on sticks collected at Savernake forms an effused faintly rose coloured stratum. The hyphae tend rather to climb any available erect body. There are no dark threads intermixed as in the American species, but Morgan thinks these are foreign and accidental. The spores are in dense clusters, and are coiled exactly as in Morgan's species, the threads have the same width, and they measure up to 245 μ in length.

Haplographium chlorocephalum Grove in Science Gossip, 1885, p. 198.

On leaves of furze, &c., Torquay, Devonshire, February, 1903. New or critical micro-fungi by A. Lorrain Smith, Journ. Bot. XLI. (1903), p. 257.

Brachycladium botryoides A. L. Sm. l. c., p. 258.

Growing on germinating grass seeds, Norwood, April, 1903.

Ampullaria aurea A. L. Sm. l. c., p. 258.

Growing on dead clover seeds, Norwood, April, 1903.

Ctenomyces serratus Eidam in Cohn's Beitr. zr. Biol. iii. (1880), p. 274.

On decaying beech and other leaves in Hampshire. Rev. W. L. W. Eyre. A. L. S. l. c., p. 257.

*See p. 55 hereof.

Since the above was published Mr. E. S. Salmon has drawn my attention to the description and figures of *Arthroderma Curreyi* Berk. published by Currey in the Quart. Journ. Micrs. Sci. II. (1854), p. 241, and again described by himself in the Journ. Quek. Micrs. Club, Nov., 1900. Mr. Salmon kindly allowed me to see a preparation of his fungus, and also a specimen from the Kew Herbarium determined by Cooke as A. Curreyi. Though on both occasions the fungus was described and published as a Hyphomycete; it is identical with the Ascomycete *Ctenomyces serratus* Eidam. Currey's genus and Berkeley's species have many years' priority, and the original name, *Arthroderma Curreyi*, must take precedence according to rule.

Tichothecium Flotow (in Koerber Krypt-Kunde 1848, p. 199).

Perithecia more or less immersed, emerging later, of a somewhat firm horny-carbonaceous substance, black, with a simple open pore; spores 8 or more in the ascus, 2 or 4-celled, brown; paraphyses coherent in a mucilaginous mass or wanting.

T. pygmaeum Körb. Parerga Lichenol., p. 467.

Perithecia scattered, entirely—or to a large extent—immersed, usually only the ostiole emerging, globose, shining, 0·1 mm. in diameter, asci broadly clavate, tapering downwards to the stalk, many-spored, about 47-52 μ long × 12-14 μ broad, spores irregularly massed, elliptical, slightly constricted, 2-celled, brown, 6-8 $\mu \times 3$-3·5 μ.

On the thallus of various stone encrusting Lichens. On the apothecium of Lecanora sp. on sandstone by the banks of the river Annan, Dumfriesshire, September, 1903. A. L. S.

Valsa heteracantha Sacc. Myc. Venet. Spec., p. 129.

Collected by Mrs. Montague in Devonshire, April, 1903. A. L. S., l. c., p. 257.

Amanita junquillea Quél. Bull. Soc. Fr., XXIII. 1876, p. 324 pl. 3, f. 10.

"This differs from *Amanitopsis adnata* W. Sm. in the striate margin of the pileus, in the presence of an annulus and in the much smaller spores."* Drawing of the plant in Herbarium British Museum. Worthington G. Smith Journ. Bot. XLI. (1903), p. 385.

Lepiota nigro-marginata Mass. Eur. Fung. Fl., p. 10.

Pileus campanulato-expanded, subumbonate; scales umber on a pale sienna-ochre ground. Stem hollow, attenuate upwards, smooth,

* See Transactions British Mycological Society, vol. I., p. 40.

salmon white; annulus distant, persistent, membranous, white. Gills broader in front, whitish; edge bordered with dark umber. Flesh thin, $2 \times 2\frac{3}{4} \times \frac{1}{8}$ in.

Amongst grass, Scarborough, May, 1885. W. G. Smith l.c. p. 385.

Lepiota atrocrocea W. G. Sm. Mass. Eur. Fung. Fl., p. 11.

Pileus expanded, slightly depressed; bright salmon-orange; more or less covered with purple-brown, almost black, granular flocci. Stem hollow, attenuate upwards; bright salmon-orange; salmon-brown squamulose. Annulus fugacious. Gills broadly adnate; salmon white. Flesh thin; salmon-orange-brown. $1\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{8}$ in.

Clevedon, Somerset, Oct., Edwin Wheeler. Allied to *L. granulosa* Batsch. and *L. amianthina* Scop. W. G. Smith l.c. p. 385.

Tricholoma squarrulosum Bres. Fung. Trid., Vol. II., p. 47, pl. 152, see pl. 4.

Pileus fleshy, 4-8 cm. across, convex then expanded, fuscous, densely covered with blackish squamules, dry, margin exceeding the gills and fibrillose. Stem 4-5 cm. high by 7-12 mm. thick, stuffed then somewhat hollow, equal or incrassated at the base, of the same colour as the pileus and *densely covered with blackish fuscous squamules*. Flesh greyish, then white. Gills sinuato-adnexed, almost free in some specimens, 6-7 mm. wide, crowded, grey, occasionally spotted with red when bruised. Spores elliptical, $7\text{-}8 \times 4\text{-}5\mu$.

Under oaks and hazel, Black House Hill Wood, Worcestershire, 17th September, 1903. C. Rea.

Easily distinguished from its allies by the blackish fuscous squamulose stem.

Collybia Henriettae W. G. Sm. Jour. Bot. XLI. 1903, p. 139.

Pileus dry, even, somewhat downy, somewhat yellowish umber, 4 in. diam. Stem attenuate upwards, subpruinose, even, slightly rooting; pale pallid yellowish brown within and without, $7\frac{3}{4}$ in. long, $\frac{1}{4}$ in. thick. Gills $\frac{5}{8}$ in. broad, broadly adnate, distant, slightly rounded near the stem. Flesh very thin. Spores $\cdot0005 \times \cdot0007$ in.

Intermediate between *Collybia radicata* Rehl. and *C. longipes* Bull.

On and about stumps, trees, &c., September.

This species differs from *C. radicata* in the dry, even, not glutinous, rugose pileus and in the much thinner flesh; in the even, subpruinose, not sulcate and glabrous stem, and in the broadly adnate attachment of the gills to the stem. It has not the fleshy, velvety pileus and stem of *C. longipes*, and differs widely in the attachment of the gills to the stem, adnexo-free in *C. longipes*.

Tricholoma squarrulosum *Bres.*

E. A. Rea del. West, Newman chromo London.

Inocybe corydalina *Quél.*

"In the Transactions for 1902, at p. 14, this species appears to be described under the name of C. subelevata W. G. Sm. Neither the description nor the name is mine, and I have seen the same description with another author's name. It must have been drawn up by someone from imperfect notes and from an imperfect copy of the original drawing in the British Museum. At any rate, no such species as C. subelevata exists. In my plant the gills are broadly adnate not adnexed." W. G. S.

Collybia planipes Brig. Fr. Hym. Eur., p. 121.

A. Clarke, Epping Forest, September, 1903. Naturalist, Nov., 1903, p. 427.

Pleurotus rufipes Mass. & W. G. Sm. Jour. Bot., XLI. (1903), p. 385.

Pileus dimidiate or reniform, convex, membranous, very glutinous when moist; white; middle salmon, margin incurved. Stem becoming recurved; viscous-reddish; salmon red within; white in centre; base downy. Gills adnate, broad, distant; white; interstices pale salmon. Pileus $\frac{1}{8}$ in. diam., stem $\frac{3}{16}$ in. long, $\frac{1}{40}$ in. diam.

On wood. Drawing by G. Massee in British Museum.

Nolanea rhodospora Broome & W. G. Sm. Jour. Bot., XLI., 1903, p. 385.

Pileus convex; sooty-fibrillose or rufescent-pilose. Stem subbulbous; white. Gills sinuate or free, salmon or rose. $1 \times 1\frac{1}{4} \times \frac{1}{16}$ in.

On earth and wooden labels in stoves. May–September.

Inocybe corydalina Quél. Jur. et Vosg., III., p. 115. See plate 4.

Pileus fleshy, 3-6 cm. across, campanulate then expanded, umbonate, whitish covered with bistre fibrils, *green at the umbo.* Stem 3-5 cm. long, 5-10 mm. thick, solid, curved, sub-bulbous, whitish, striate, pruinose. Flesh white becoming yellowish with age. Odour pleasant (like the scent of Corydalis cava, according to Quélet). Gills adnate, emarginate, 5-7 mm. wide, whitish then brown, edge fimbriate and white. Spores elliptical $7\text{-}9 \times 4\text{-}5\mu$ brown. Cystidia fusiform, ventricose $42\text{-}51 \times 15\text{-}18\mu$.

Under oaks, Crew's Hill Wood, Worcestershire, 17th September, 1903. C. Rea.

Easily known amongst the *Laceri* group by its green prominent umbo.

Inocybe praetervisa Quél. Bres. Fung. Trid., Vol. I., p. 35, pl. 38. See plate 5.

Pileus fleshy 2-6 cm. across, conico-campanulate then expanded,

umbonate or gibbous, often splitting at the margin with age, *slightly viscid*, *fibrillose*, glabrous at the centre, soon *longitudinally virgate*, *fawn* but generally darker at the margin. Stem 4-7 cm. long, 4-8 mm. thick, solid, round, pruinose at the apex, base bulbous and marginate, slightly attenuated upwards, *white* then pale straw-colour with age. Flesh white, odour somewhat earthy. Gills attenuated behind, adnexed, almost free, narrow, 3 mm. wide, crowded, white then dirty cinnamon with a white fimbriate edge. Spores angular 9-11 × 5-6μ yellowish ochre. Cystidia fusiform, ventricose, 55-75 × 18-30μ, somewhat fuscous at the apex.

On the ground, Swarraton, Hants., 15th August 1903. Rev. W. L. W. Eyre.

Distinguished from Inocybe fastigiata and rimosa by its long angular spores and white or pale straw-coloured stem.

Inocybe brunnea Quél. Soc. Sc. n. de Rouen, 1879, pl. 2, f. 7.

Pileus campanulate, 3-5 cm. across, umbonate, fibrillosely silky, then cracked, *chestnut*. Stem 6 cm. high, 5 mm. thick, stuffed, thickened at the base, *fibrillosely striate*, light brown, white and pruinose at the apex. Cortina *concolorous* and fugacious. Flesh white. Gills emarginate, broadest in front 5 mm. wide, cream colour then umber, with the edge white and indented. Spores bistre 7-12 × 4-6μ.

Amongst grass near Pines, Savernake Forest, 9th October, 1903.

Inocybe fulvella Bres. Fung. Trid., Vol. II., p. 16, pl. 119, f. 2.

Pileus 6-12 mm. across, conico-campanulate then expanded and umbonate, flocculosely silky, glabrous at the centre, somewhat hygrophanous, olivaceous honey-colour with the umbo somewhat darker then becoming yellowish or fuscous olive with the umbo tawny. Stem 2-3 cm. long, 1-2 mm. thick, stuffed, attenuated downwards, glabrous, white pruinose at the apex, lilac but soon changing to rufescent. Flesh yellowish, 2 mm. thick at the centre of the pileus, lilac at the apex of the stem and then rufescent. Gills ventricose, 1-5 mm. wide, rounded behind and almost free, subdistant, lilac then cinnamon, edge fimbriate. Spores ferruginous, angular and warted 7-9 × 5-6μ. Cystidia fusiform, ventricose 45-60 × 10-18μ, somewhat fuscous at the apex.

Amongst moss. Wyre Forest, Salop, 31st August 1903. C. Rea.

The lilac tint of the stem, flesh, and gills can only be observed in the field as it very quickly disappears with age or dryness.

Agaricus versicolor With. Ed. 3, Vol. IV., p. 166 (1796).

This Worthington G. Smith refers to *Armillaria mellea* Vahl. Jour. Bot. XLI. (1903), p. 341.

Schulzeria Grangei *Eyre.*

E.A. Rea del. West Newman chromo London.

Inocybe praetervisa *Quél.*

Hypholoma pseudostorea W. G. Sm. Jour. Bot. XLI. (1903), p. 386.

Pileus convex, obtuse or subumbonate, then expanded, fleshy; at first purplish-brown with a darker middle, soon breaking up into large, fibrillose, purplish-brown scales, silky-white to pale fawn beneath the scales; margin appendiculate and entire when young. Stem hollow, equal or attenuate downwards, at first even, then silky-brown fibrillose; white above, pale yellowish below. Gills adnate, at first white, then rose, becoming brown to purple-brown; not exuding drops of water. Usually caespitose, sometimes solitary. Taste insipid, somewhat disagreeable; odour strong, disagreeable. Spores 5-7 × 2·5-3μ. $2\frac{7}{8} \times 4\frac{1}{2} \times \frac{1}{2}$ in.

Woods, plantations, under larches, September-November.

This is the plant usually described, when found in this country, as A. storea Fr. Dr. Plowright* thinks it is *H. lacrymabundum* Fr., but as our plant never has any tear-drops it can hardly be *H. lacrymabundum*. Spores of *H. lacrymabundum* 9-11 × 6μ.

Paxillus porosus Berk. W. G. Smith, Jour. Bot. XLI. (1903), p. 386.

Not unlike *P. involutus*, to which it is allied, but the margin is never involute, and the pores are sulphury-green, changing to pale blue or brownish when bruised. $4\frac{3}{8} \times 3\frac{7}{8} \times \frac{3}{4}$in. Tasteless, odour very strong, unpleasant.

Moist woods, under firs. Small forms somewhat resemble *Boletus piperatus*.

Hygrophorus melizeus Fr. Hym. Eur., p. 406, Fr. Ic., t. 165, f. 3.

Rievaulx, collected at Yorkshire Fungus Foray. Naturalist, November, 1903, p. 426.

Hygrophorus Karstenii Sacc. and Cub.

The record of *H. bicolor* Karst., noted in the Naturalist for Nov., 1902, p. 356, and at p. 38 of the Trans. Brit. Myc. Soc., Vol. II., should be altered to *Karstenii*, as there is another *H. bicolor* B. & Br. W. G. Sm. Jour. Bot., XLI. (1903), p. 314.

Hygrophorus Clarkii B. & Br. Ann. and Mag. Nat. Hist., May 1873, p. 341.

Worthington G. Smith identifies the *H. latitabundus* Britz., described by M. C. Cooke on p. 14 of the Trans. Brit. Myc. Socy., Vol. II., as this species. Jour. Bot. XLI. (1903), p. 314.

* See Trans. Brit. Myc. Soc., Vol. I., p. 45. It is referred to *H. cotoneum* by Quél CR.

Lactarius sanguifluus Fr. Epicr., p. 341. Fr. Hym. Eur., p. 431.

Resembles *L. deliciosus*, but the milk in place of being orange is deep blood-red changing to green. $2\frac{1}{2} \times 2 \times \frac{3}{4}$ in.

Wick, 21 October, 1845. Drawing in British Museum. W. G. Smith, Jour. Bot. XLI. (1903), p. 386.

Poria obliqua Fr. Syst. Myc., p. 378. Fr. Hym. Eur., p. 570. Fr. Icon., 188, f. 1.

Broadly effused, 4-9 m. thick, flesh thin, from pale to brownish-black, edge usually raised, crested ; pores very small, long, somewhat angular ; spores globose, brown, 5-7μ in diameter.

On dead trunks of *Citrus*, *Alnus*, *Robinia*.

Guildford, February, 1883. C. E. Broome. Example in British Museum. W. G. Smith, Jour. Bot. XLI. (1903), p. 386.

Merulius confluens Schwein. Syn. Fung. Car. 1822. No. 836.

Resupinate, longitudinally effused, somewhat fleshy, margin free, inflexed, sub-tomentose, pallid, folds uneven, reticulate, porose.

On branches of *Alnus*.

Leigh Wood, Clifton, August, 1843, C. E. Broome. W. G. Sm. Jour. Bot. XLI, (1903), p. 386.

Cyphella griseo-pallida Weinm. Ross Obs. Rec., 1836, p. 522. Fr. Hym. Eur. p. 662.

Sub-membranaceous globose to campanulate, sessile *pallid-grey*, *exterior floccose ;* hymenium smooth ; spores ovate acuminate.

On trunks and branches of various trees. On elm and elder bark, December, 1873, C. E. Broome. Examples in British Museum. W. G. Sm. Jour. Bot. XLI. (1903), p. 386.

Clavaria luteoalba Rea. Pl. 3.

Clubs simple, fasciculate or scattered, stuffed, 4-5 cm. high × 2-3 mm. thick, gradually attenuated to the base, *apex constantly white*, acute or blunt, the remainder of the club being of a deep rich yellow. Spores white, pip-shaped, 5-6 × 3μ.

Amongst grass and bracken, Invermay, Perthshire, 30th September, 1903, and Savernake Forest, 6th to 10th October, 1903, C. Rea.

Distinguished from all other yellow *Clavariae* of the *Syncoryne* group by the apex, which is white from the very first.

Geaster umbilicatus Fr. Syst. Myc. iii., p. 14.

Exoperidium multifid, segments laciniate, unequal, sub-lanceolate,

soft, somewhat flattened, sooty brown inside; endoperidium globose or globose-depressed sessile, umbilical centre orbicular, depressed, marginate; peristome conical, plicate-striate, fimbriate at the apex and twisted; capilitium brown; spores globose, 3·5-4μ diam., umber-brown.

On the ground, Hereford, November, 1870. W. G. Sm. Jour. Bot. XLI. (1903), p. 387.

Sphaerobolus dentatus (With). W. Sm. Jour. Bot. XLI. (1903), p. 280.

Peridium finely pilose with erect hairs, springing from scanty brownish mycelium, opening above in a 4-7 stellate manner, the rays clad with long white hairs, which at first converge over the opening; outside pale livid-buff to vinous brownish, pale brown, or brown; inside white, ivory, white-greyish, or faint olive-ivory; ejecting a reddish-brown peridiolum. $\frac{1}{16}$in. diam., scattered.

Dead elder, Failand, Somerset, R. Baker, August, 1888.

The following Members have joined the British Mycological Society during the year 1903.

Adams, Mr. Alfred, M.A., M.B., Bridgend House, West Looe, Cornwall.
Amphlett, Mrs. Eliza A., Dalehurst, 7, Bardwell Road, Oxford.
Clarke, Mr. James, Chapel House, Paisley.
Claridge, Miss M., 8, Park Terrace, Oxford.
Grafton, Miss May, Stoke Prior.
Grant, Mr. Angus, Drumälan, Drumnadrochit.
Lister, Mr. Arthur, F.R.S., Leytonstone and Highcliff, Lyme Regis.
Lister, Miss Gulielma, Leytonstone and Highcliff, Lyme Regis.
Miles, Miss Mary, L.L.A., Laurel Bank, Bridgend, Perth.
Ogle, Mr. B. S., Hill House, Steeple Aston, Oxford.

OFFICERS FOR THE SEASON 1903.

President: The Rev. W. L. W. Eyre, M.A., Swarraton, Alresford, Hants.

Vice-President: Professor H. Marshall Ward, D.Sc., F.R.S., &c., University Botanical Laboratory, Cambridge.

Hon. Secretary and Treasurer: Carleton Rea, B.C.L., M.A., &c., 34, Foregate Street, Worcester.

Published 14*th April*, 1904.

THE WHITBY FORAY.

12th to 17th September, 1904.

The eighth annual week's Fungus Foray was held in the neighbourhood of Whitby, where the Hotel Métropole was constituted the headquarters for the meeting. The members assembled at Whitby on the evening of Monday, the 12th of September, and proceeded to discuss some specimens that they had brought with them. Dr. D. Paul offered for inspection some examples of the somewhat scarce *Inocybe calamistrata* Fr. which he had received from our fellow member Mr. Angus Grant, from the neighbourhood of Drumnadrochit. Dr. W. Watson handed round some very large specimens of *Peridermium pini* (Willd.). Mr. W. B. Allen exhibited some nice forms of *Collybia extuberans* Batt., *Inocybe maritima* Fr., *Cortinarius (Inoloma) traganus* Fr., *Polyporus rufescens* Fr. and *Mitrophora semilibera* Lév. And on the following morning the Hon. Sec. drew their attention to a specimen of *Hydnum graveolens* Delast. which he had recently received from their member Dr. Adams, of Looe. This fungus possesses a very strong penetrating smell suggestive of Fenugreek or Belladonna.

On Tuesday, the 13th of September, the members booked by the 10.5 train from the Town Station to Egton, from whence a short walk brought them to the Arncliffe Woods. These woods are very picturesquely situated on the banks of the River Esk and in a favourable season abound with fungi, but only the following were found worthy of note: *Mycena haematopus* Pers., *Amanita virosa* Fr., *Inocybe hystrix* Fr., *Naucoria sobria* Fr., *Russula densifolia* Secr., *Cortinarius (Phlegmacium) decoloratus* Fr., *(Telamonia) armillatus* Fr. *(Hygrocybe) bicolor* Cke. and *Cordyceps ophioglossoides* Fr. parasitic on *Elaphomyces variegatus* Vitt. After the woods had been thoroughly searched the members returned by train from Glaisdale to Whitby and proceeded at once to place out the more uncommon specimens on exhibition in a sitting-room at the Hotel Métropole which was exclusively reserved for the use of the members during the remainder of the week. At the evening meeting (in the absence of the President, Mr. Worthington G. Smith, F.L.S.) Dr. W. Watson was unanimously called upon to preside over the meetings during the foray. A vote of condolence and deep sympathy was then carried with The Cryptogamic Society of Scotland at the great loss they and all other British mycologists

had suffered by reason of the lamented death of their late secretary, the Rev. John Stevenson, L.L.D., and a similar resolution was passed to his widow and family, and the Hon. Sec. was requested to forward such resolutions to his widow and The Cryptogamic Society of Scotland. The election of officers for the ensuing year then took place. Mr. R. H. Biffen, M.A., was unanimously elected President; Professor H. Marshall Ward, D.Sc., F.R.S., &c., Vice-President; and Mr. Carleton Rea, B.C.L., M.A., Hon. Secretary and Treasurer. The Hon. Secretary and Treasurer announced that two ordinary members had been elected since their last meeting, viz., B. S. Ogle, Hill House, Steeple Aston, Oxford, and Miss Agnes Fry, Failand House, Failand, near Bristol, and that the sum of £23. 4s. 6d. stood to their credit at the Post Office. The date for the foray at Haslemere in 1905 was left to be arranged so as to suit the convenience of the President elect and "The Haslemere Microscope and Natural History Society."* Several suggestions for the place of meeting for the 1906 foray were discussed but no decision was arrived at. A paper on "Recent Researches on Parasitism" by R. H. Biffen, M.A. (see p. 84), was then read.

On Wednesday, the 14th of September, the members were busy up till 11.40 in examining the fungi collected on the previous day and then at that time departed from the West Cliff Station for Sands End. Here they detrained and walked up to the entrance lodge of the Mulgrave Woods (permission to visit which had been kindly granted by the owner, the Rev. the Marquess of Normanby), where the members first spread out over some open pastures and then proceeded into the woods surrounding the Castle. Although a careful search was made, few fungi were boxed, the most noteworthy being *Mycena Iris* Berk., *M. cruenta* Fr. *Pluteus salicinus* Pers., *Eccilia atropuncta* Pers., *Inocybe mutica* Fr., and *Cortinarius (Phlegmacium) prasinus* Schaeff. On the return walk to Sands End fine examples of *Coprinus squamosus* Morg.† were found growing at the railway station at the base of a post. In the evening the annual club dinner was held at the Hotel Métropole, after which the members proceeded to the Club-room and debated Saccardo's "De diagnostica et nomenclatura mycologica," a translation of which is appended at p. 80, and the resolutions in respect to those suggestions are there set out in full.

On Thursday, the 15th of September, the members took the 10 o'clock train from the Town Station to Sleights and proceeded through Iburndale to the woods near the Falling Foss. Here

* This has now been arranged and is fixed for Monday to Saturday, 25th to 30th September.

† For description see Trans. Brit. Myc. Soc. vol. I., p. 158.

the members separated, some walking over the moors to Robin Hood's Bay, whilst others caught the return train at Ruswarp. The most interesting specimens collected during the day included *Amanita porphyrea* A. & S., *Mycena haematopus* Pers., *Nolanea papillata* Bres. (New to Britain), *Pluteus nanus* Pers., *Inocybe Godeyi* (Gillet) Mass., *Paxillus giganteus* Fr. and *Hygrophorus unguinosus* Fr. The Rev. W. L. W. Eyre sent by post to the meeting two nice examples of the somewhat rare *Amanita Vittadinii* Morett. In the evening, at the Club-room, Mrs. Rea exhibited some paintings* of fungi which were recent additions to the British Fungus Flora, viz., *Inocybe brunnea* Quél and *Inocybe fulvella* Bres. described on page 64 of the last number of The Transactions. *Inocybe Godeyi* (Gillet) Mass. which exactly agreed with the description of this species as defined by Mr. Massee in his recent "Monograph of the genus Inocybe" in the Annals of Botany (July) 1904, p. 481. A new *Tricholoma*, which her husband had ventured to name *horribile* Rea. and *Lycoperdon depressum* Bon. and dried specimens of this last were handed round for inspection.

On Friday, the 16th of September, the members devoted the morning to investigating the previous day's material and then they took the 1.40 train from the Town Station to Goathland. A short walk through the village soon brought the members to the woods near Mallyans Spout, where fungi were found in some abundance and regret was expressed that time did not allow of a more prolonged search. Amongst the most noteworthy we may enumerate *Mycena dissiliens* Fr., *Cortinarius (Telamonia) armillatus* Fr., *Hygrophorus turundus* Fr. var. *mollis* B. & Br. and *Boletus tenuipes* Cke. In the evening, at the headquarters, a paper entitled "Eriksson's recent researches on the vegetative life of the cereal rust fungi" was read on behalf of C. B. Plowright, M.D. (see p. 76).

On Saturday, the 17th of September, most of the members departed homewards, but a few visited the neighbourhood of Robin Hood's Bay and walked over the moors and through the woods to Flying Hall Station, securing on the way specimens of *Marasmius Hudsoni* Fr. and *Nectria coccinea* (Pers.) Fr. Miss A. Lorrain Smith, F.L.S., subsequently reported the discovery of a new variety of a mould hitherto unknown in Britain, namely, *Mortierella pilulifera* van Tiegh. var. *parvispora* A. L. Sm., which she fully describes at page 92. Over 340 specimens of fungi were collected during the foray, which may be regarded as satisfactory considering the unfavourable conditions of the ground worked.

* See plates 7, 8, and 9.

COMPLETE LIST OF FUNGI GATHERED DURING THE FORAY.

Amanita virosa Fr., phalloides Fr., mappa Fr., porphyria A. & S., muscaria Linn., rubescens Pers., spissa Fr.

Amanitopsis vaginata Bull., strangulata Fr.

Lepiota cristata A. & S., granulosa Batsch, amianthina Scop.

Armillaria mellea Vahl.

Tricholoma flavobrunneum Fr., albobrunneum Pers., rutilans Schaeff., terreum Schaeff., saponaceum Fr., cuneifolium Fr.

Clitocybe nebularis Batsch., clavipes Pers., infundibuliformis Schaeff., geotropa Bull., metrachroa Fr., ditopus Fr., fragrans Sow.

Laccaria laccata (Scop.) Berk.

Collybia radicata Relh., fusipes Bull., maculata A. & S., butyracea Bull., vertirugis Cke., confluens Pers., cirrhata Schum., tuberosa Bull., acervata Fr., dryophila Bull., ambusta Fr.

Mycena pura Pers., luteoalba Bolt., lactea Pers., rugosa Fr., galericulata Scop., polygramma Bull., dissiliens Fr., alcalina Fr., ammoniaca Fr., filopes Bull., Iris Berk., haematopus Pers., cruenta Fr., sanguinolenta A. & S., galopus Pers., leucogala Cke., clavicularis Fr., tenerrima Berk.

Omphalia umbellifera L., grisea Fr., fibula Bull., var. Swartzii Fr.

Pluteus cervinus Schaeff., salicinus Pers., nanus Pers.

Entoloma lividum Bull., porphyrophaeum Fr., jubatum Fr., sericellum Fr., clypeatum Linn., rhodopolium Fr., sericeum Fr., nidorosum Fr.

Clitopilus prunulus Scop.

Leptonia anatina Lasch., lampropus Fr., incana Fr.

Nolanea pascua Pers., mammosa Linn., papillata Bres., picea Kalch.

Eccilia atropuncta Pers.

Pholiota erebia Fr., togularis Bull., radicosa Bull., squarrosa Müll., mutabilis Schaeff., marginata Batsch.

Inocybe hystrix Fr., lanuginosa Bull., cincinnata Fr., pyriodora Pers., mutica Fr., Godeyi (Gillet) Mass., rimosa Bull, asterospora Quél., geophylla Fr.

Hebeloma fastibile Fr., crustuliniforme Bull., longicaudum Pers.

Flammula tricholoma A. & S., carbonaria Fr., sapinea Fr., scamba Fr.

Naucoria badipes Fr., sobria Fr., escharoides Fr.
Galera tenera Schaeff., hypnorum Batsch.
Tubaria furfuracea Pers., paludosa Fr., stagnina Fr., crobula Fr., inquilina Fr.
Agaricus arvensis Schaeff., campestris L., haemorrhoidarius Kalch.
Stropharia aeruginosa Curt., albocyanea Desm., stercoraria Fr., semiglobata Batsch.
Hypholoma sublateritium Schaeff., capnoides Fr., epixanthum Fr., fasciculare Huds., dispersum Fr., pyrotrichum Holmsk., velutinum Pers., appendiculatum Bull., hydrophilum Bull.
Psilocybe subericea Fr., semilanceata Fr., var. caerulescens Cke., foenisecii Pers.
Psathyra corrugis Pers., fibrillosa Pers.
Anellaria separata (Linn.) Karst.
Panaeolus sphinctrinus Fr., campanulatus L.
Psathyrella gracilis Fr., hiascens Fr., atomata Fr., disseminata Pers.
Coprinus comatus Fr., atramentarius Fr., squamosus Morg., niveus Pers., lagopus Fr., cinereus Schaeff., micaceus Bull., radiatus Fr., plicatilis Curt.
Bolbitius vitellinus Pers.
Cortinarius (Phlegmacium) largus Fr., multiformis Fr., purpurascens Fr., prasinus Schaeff., decoloratus Fr.
(Myxacium) mucifluus Fr., elatior Pers.
(Inoloma) pholideus Fr.
(Dermocybe) tabularis Fr., caninus Fr., sanguineus Wulf., cinnamomeus Linn., and var. semisanguineus Brig.
(Telamonia) torvus Fr., armillatus Fr., hinnuleus Sow., hemitrichus Pers., paleaceus Weinm.
(Hydrocybe) bicolor Cke., leucopus Bull.
Gomphidius glutinosus Schaeff., viscidus L., gracilis Berk.
Paxillus giganteus (Sow.) Fr., involutus Batsch.
Hygrophorus eburneus Bull., cossus Sow., pratensis Pers., virgineus Wulf. and var. roseipes Mass., niveus Fr., laetus Pers., vitellinus Fr., ceraceus Wulf., miniatus Fr., turundus Fr. var. mollis B. & Br., obrusseus Fr., intermedius Pass., conicus Scop., calyptraeformis B., chlorophanus Fr., psittacinus Schaeff., unguinosus Fr.
Lactarius torminosus., Schaeff., turpis Weinm., pubescens Schrad., blennius Fr., pyrogalus Bull., chrysorheus Fr., pergamenus Sw., vellereus Fr., deliciosus Linn., pallidus Pers., quietus Fr., aurantiacus Pers., vietus Fr., rufus Scop., glyciosmus Fr., fuliginosus Fr., volemus Fr., serifluus DC., mitissimus Fr., subdulcis Bull.

Russula nigricans Bull., adusta Pers., densifolia Secr., chloroides (Kromb.) Bres., furcata Pers., rosacea Pers., virescens Schaeff., lepida Fr., rubra Fr., xerampelina Schaeff., vesca Fr., cyanoxantha Schaeff., galochroa Fr., consobrina Fr., foetens Pers., fellea Fr., emetica Harz., fallax Schaeff., ochroleuca Pers., fragilis Pers., citrina Gillet, nitida Pers., puellaris Fr., lutea Huds.

Cantharellus cibarius Fr., aurantiacus Wulf., tubaeformis Fr., infundibuliformis Scop.

Nyctalis parasitica Bull.

Marasmius peronatus Bolt., oreades Bolt., erythropus Fr., ramealis Bull., rotula Scop., androsaceus L., Hudsoni Pers., epiphyllus Fr.

Lentinus cochleatus Fr.

Lenzites betulina L.

Boletus luteus L., elegans Schum., flavus With., flavidus Fr., granulatus L., tenuipes Cke., badius Fr., variegatus Swartz., chrysenteron Bull., subtomentosus L., edulis Bull., laricinus Berk., scaber Fr. var. aurantiacus Bull., versipellis Fr., felleus Bull.

Polyporus squamosus Fr., giganteus Fr., hispidus Fr., rutilans Fr., betulinus Fr., adustus Fr.

Fomes annosus Fr.

Polystictus versicolor Fr., abietinus Fr.

Poria mollusca Fr., vaporaria Fr., blepharistoma B. & Br.

Hydnum repandum L. and var. rufescens Pers. farinaceum Pers.

Irpex obliquus Schrad.

Grandinia granulosa Pers.

Stereum hirsutum Willd., rugosum Pers.

Hymenochaete rubiginosa Lév.

Clavaria muscoides L., cinerea Bull., cristata Pers., rugosa Bull., inaequalis Fl. D., vermicularis Scop., tenuipes B. & Br.

Calocera viscosa Pers.

Auricularia mesenterica Fr.

Tremella mesenterica Retz.

Scleroderma vulgare Fr., verrucosum Pers.

Sphaerobolus stellatus Tode.

Lycoperdon saccatum Vahl., gemmatum Batsch, pyriforme Schaeff., perlatum Pers., nigrescens Vitt.

Ithyphallus impudicus Fisch.

Mutinus caninus Fr.

Cephalosporium acremonium Corda.

Botrytis cinerea Pers.

Torula antennata Pers.

Trichosporium fuscum Sacc.

Zygodesmus fuscus Corda.

Haplographium chlorocephalum Grove.

Steganosporium pyriforme Corda.
Sphaeronemella fimicola March.
Nectria coccinea (Pers.) Fr.
Cordyceps ophioglossoides Fr.
Podospora decipiens (Wint.)
Sporormia minima Auersw.
Melanomma Pulvis pyrius Fckl.
Hypoxylon effusum Nke.
Mucor mucedo Pers.
Pilobolus crystallinus Tode.
Mortierella pilulifera van Teigh. var. parvispora A. L Sm.
Dictyostelium mucoroides Bref.
Ascobolus vinosus Berk.
Saccobolus neglectus Boud.
Helotium claroflavum Berk.
Ciboria ochroleuca Mass.
Lachnea hirta Gillet, scutellata Gillet, hemispherica Gillet.
Neottiella polytrichi Mass.
Humaria granulata Sacc.
Peziza succosa Berk.
Otidea aurantia Mass.
Leotia lubrica Pers.
Elaphomyces variegatus Vitt.

*Mycetozoa**

Physarum nutans Pers. γ leucophaeum.
Didymium nigripes Fr. α genuinum.
Comatricha typhoides Rost. α genuina.
Tubulina fragiformis Pers.
Arcyria incarnata Pers.

*These determinations were kindly confirmed by Mr. A. Lister, F.R.S.

ERIKSSON'S RECENT RESEARCHES ON THE VEGETATIVE LIFE OF THE CEREAL RUST FUNGI.*

By Charles B. Plowright, M.D.

In the present communication the author points out that since the 'sixties, when De Bary made public his work on the life-history of the three common Pucciniae parasitic upon the cereals of Europe, continued experimental researches have shown that these three species consist in reality of no fewer than twelve. He further indicates that De Bary's work, important and accurate as it was, deals with the three species then known as *P. graminis*, *straminis*, and *coronata*, in which he showed their relationship to the three common Æcidia on Barberry, Anchusa and Rhamnus. It did not afford an explanation of the manner by which in large areas of country the crops are simultaneously attacked by these rust and mildew parasites. He emphasises the fact so well known to those who study fungi in the field, that the area of infection does not extend much beyond 50 or 60 yards from a Barberry or Buckthorn bush. He further urges again that his hypothesis of a mycoplasmic symbiosis existing between the fungus and the host-plant explains the widespread dissemination of these parasites better than any other. His view is that this "mycoplasm" exists as a form of protoplasm (see Fig. A.) within the cells of the host, which can be demonstrated in those varieties of Wheat that are speciallysubject to the parasite, as soon as the first green leaf appears above ground. That this mycoplasm lives symbiotically in the tissues of the plant until such time as favourable conditions, climatic and other, cause it to pass into the typical mycelial stage from which the spore-beds of the Uredo are formed. If this can be shown to be the case, an explanation of those sudden and widespread outbreaks of Wheat-mildew which sometimes occur in England and the annual decimation which Wheat-rust causes in Australia and other countries become explicable, and, what is of infinitely more importance, it would give us a clue as to what lines on which we should fight the disease.

* (*Uber das Vegetative leben der Getreiderostpilze*, Jakob Eriksson. I. Puccinia glumarum von Jakob Eriksson und Georg Tischler with three coloured plates; 4to. 1904. Stockholm: P. A. Norstedt & Sons. London: William Wesley & Son, 28, Essex Street, Strand.)

The hypothesis is by no means an unthinkable one, but its mere plausibility must not make us accept it. In the first place it is new, and we cannot cast off our old views at a moment's notice,. Then again we have seen the mycelium, but we have not—most of us, at any rate—ever seen this mycoplasm. Eriksson has selected for its demonstration certain varieties of Wheat which are year by year affected in Sweden with *Puccinia glumarum*, notably Horsford's Pearl Wheat. Some of it was sown in October, 1902, and when the seedlings had attained a height of

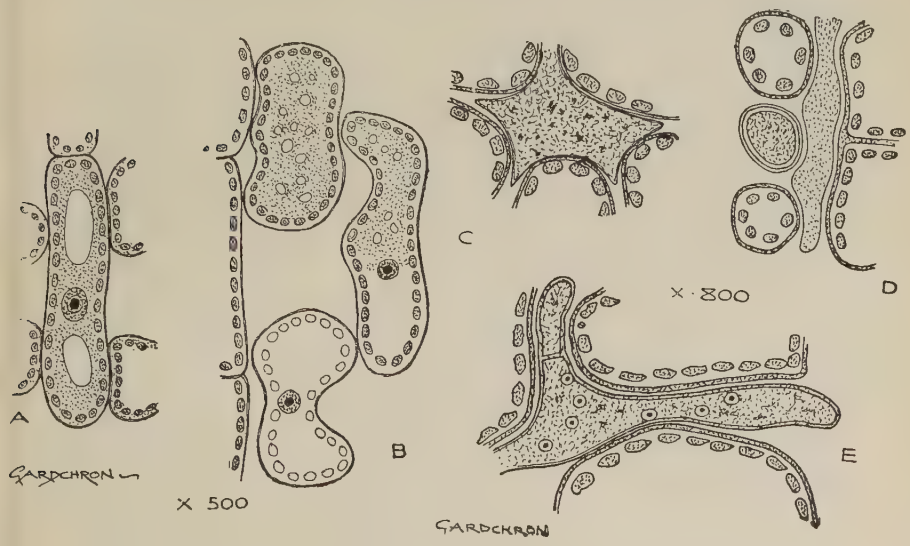


FIG 1*—A TO E, SHOWING THE MYCOPLASM FROM ERIKSSON'S FIGURES, TABB. I.—III.

A—*Tab. i., f.* 2, *b.*—Cell of Wheat seedling with mycoplasmic contents containing two vacuoles.

B—*Tab. i., f.* 5.—Three cells of little older seedling, showing one cell filled with mycoplasm, another partially filled, and the third quite devoid of it.

C—*Tab. ii., f.* 11, *c.*—Mass of mycoplasm between the cells of Wheat leaf in the month of July, taken from the periphery of an area containing sori of Uredo glumarum. About 4-6 mm. beyond the outer sori, the mass fills the interspace between five cells and is sending prolongations between them.

D—*Tab. ii., f.* 11, *a.*—Extension of plasm between the cells' granular contents more obvious, including membrane scarcely apparent.

E—*Tab. iii., f.* 14.—Further stage, the mass of mycoplasm has become invested with a distinct membrane, of which the double contour is apparent; one septum has formed. Clearer area is seen around some of the larger granules.

* Reproduced by kind permission of "The Gardeners' Chronicle, Ltd."

35 or 40 mm., which was in twenty-three days from the date of sowing, a portion of the first green leaf of one of them was examined. Various fixing solutions were employed in these experiments, such as Flemming's chrom-osmium-acetic acid, Hermann's platinochloride mixture, absolute alcohol, &c.; while for stains Flemming's saffranin - gentian - violet - orange -, and fuchsinmethylgreen were made use of.†

The accompanying figure (fig. 1, A), reproduced from Eriksson's plate 1, fig. 2, *b*, shows what he saw. A cell of the host-plant whose nucleus has stained red is filled by mycoplasmic material, in which two large vacuoles are seen one above the other below the nucleus.

Fig. 1, B, t. i., f. 5, shows three cells from a little older seedling (forty-four days after sowing), in which the second green leaf was unfolding. The upper cell is seen to be filled by mycoplasm, the middle half filled, and the lowermost quite devoid of it. Many hundreds of sections have been cut by the authors, of which only a certain number show the mycoplasm present. When present, it is found to fill more or less of the lumen of the cells, and to contain granules, which are coloured pale-violet by Flemming's staining reagent, and dark blue by Heidenhain's haematoxylon. Eriksson regards it as being something intermediate between ordinary protoplasm and typical fungus-protoplasm. Sections of leaves from plants of Bromus inermis and Festuca arundinacea, which have been under observation for many years, and which had had no Uredo upon them for certainly the last ten, showed no mycoplasm. Neither could it be found in those varieties of Wheat which are seldom attacked by *Uredo glumarum*, notably Bart Trimenia, Medeah, and Madonna.

The existence of a fungoid parasite in the tissue of its host in the form of a plasma is not a new fact, or one confined to the cereal Uredines. The well-known instance of Plasmodiophora will at once suggest itself. Pseudocommis, again, about which such a copious literature has sprung up during the last few years, affords another instance. With this, however, it has been suggested some of these bodies may be products made by the action of the reagents employed, and that they are tannin and its derivatives. Still, whatever may be the case with Pseudocommis, which for the most part occurs late in the life of the cells of the plant, one would hardly expect to find tannin in the first green leaf of a cereal.

More recently, Zukal speaks of finding "amœboid plasmatic bodies" in the cells of living Barley-leaves, in his work on the Rust-diseases of the cereals of Austria-Hungary, as quoted by

† The various solutions are given in the paper, p. 7.

Eriksson. The observations of René Maire, in the *Bulletin de la Société Mycologique de France*, 1901, with regard to the life-history of Endophyllum sempervivi, are also to the point.

With regard to *P. glumarum*, no mycelium is developed until the following summer, in the month of July, when the Uredo spores are formed. Sections taken from an affected leaf 4 to 6 mm. beyond the most external spore-bed, and treated in the same manner, show the mycelium to consist at first of masses of granular mycoplasm between the cells of the plant (fig. 1, c, t. ii., f. 11, *c*). From these masses outgrowths take place which force their way among the cells (fig. 1, D, 2, f. 11, *a*). At first the granules are very small, but they soon increase in size. These elongated masses become invested by a very delicate membrane which thickens and eventually acquires a double contour. Septa now appear, and some of the granules become surrounded by a clearer area. These changes are shown by t. ii., f. 11, *a*, where an elongated mass is seen extending between the cells. Fig 1, E, t. iii. f. 14, shows a later stage, in which a double contoured membrane has invested such an extension. The granules are larger, many of them surrounded by clearer areas, and septation has commenced.

More recently (*Comptes Rendus*, July 4, 1904), Eriksson has confirmed the above results with two or three species, viz., the crown rust of Rye (*P. dispersa*), and the yellow rust of Barley *P. glumarum f. Hordei.* With these he finds an extension of the plasmic masses takes place not only between the cells of the host plant, but, like other forms of protoplasm, it often occurs from cell to cell through the normal openings which exist in the cell walls. Thus those endohaustoria are produced in the cells, which he has designated special corpuscles. The fact that a parasitic fungus can exist in a protoplasmic form in the tissues of its host and only develop mycelium and spores under certain conditions of environment is an extremely important one and one which, if proved, will explain some of the unsolved mysteries connected with the life-history of the Potato disease, not to mention other epidemic plant diseases. That the subject is one worthy of study is shown by the fact that our distinguished Vice-President, Professor Marshall Ward (than whom no one is better able to elucidate the whole question), has undertaken a series of investigations with regard to it.—*King's Lynn, September* 14, 1904.

DE DIAGNOSTICA ET NOMENCLATURA MYCOLOGICA; ADMONITA QUAEDAM.

SACCARDO

I. "Authors of new species, who describe them at length both morphologically and biologically, should append diagnoses of them in the usual form, in English, French, German or Italian, but above all, if it be possible, in Latin. The scattered and often incomplete statements of essential characters are found only with difficulty in the long and frequently formless descriptions. In consequence, the diagnoses available for systematic compendia are often vitiated, entirely through the fault of the original authors."

Approved but add that the essential differences between allied species should be emphasized and distinguished.

II. "The host plants of fungi shall be designated by their Latin names, and not by vernacular names in English, Italian, &c., which are often of doubtful meaning.

"It is of the utmost importance that every author should indicate the matrix, or host plant, particularly of parasitic fungi."

Approved but add that in the case of non-parasitic fungi the kind of wood or nature of the soil should be designated if possible and in the latter case the kind of surrounding vegetation, *e.g.*, dead elm stump, under oaks on calcareous soil, &c.

III. "The metric system alone shall be used in indicating measurements. When these are small, the micromillimeter should be employed. Fractions of millimeters, or other measurements, burdened with marks or signs, are ready sources of error."

Approved.

IV. "For the sake of brevity, the sign ⁘, already in use since 1872, should be employed between figures indicating the extremes of length and width of microscopic organs, in place of the sign ×, =, :, which are made use of by mathematicians in another sense."

Dissented from and resolved that the use of the old Saint Andrew's Cross be maintained as having received the sanction of intelligible usage, and that the sign ⁘, would be almost unintelligible to ordinary botanists.

V. "When a specific name is transferred to another genus, the original author is cited in parenthesis (a practice earnestly to be commended), while the author of the new combination is also to be cited. Example: Winter wrote *Sphaerella convexula* (Schw.), omitting the author of the combination. But this is a misleading citation, as the reader can make of it either *Sphaerella convexula* (Schw.) Wint., or *Sphaerella convexula* Wint.: both citations are erroneous, as the proper one is *Sphaerella convexula* (Schw.) Thüm."

Approved subject to the favourable reception of rules IX., X., XI., and XII.

VI. "Names of systematic divisions should be written uniformly in the feminine gender, as the word *plantae* is understood. This has the sanction of the best usage. We often find in succession: *Euthallophyta . . . Phycomycetes . . . Mucoraceae.* These would be much more correctly written: *Euthallophytae . . . Phycomycetae . . . Mucoraceae.*"

Approved.

VII. "The following terminology for the receptacles, spores, &c., of fungi is recommended, in order that there may be as much uniformity as possible—

Hymenomycetae: pileus (whatever the form); basidia; sterigmata; sporae; cystidia.

Gasteromycetae and *Myxomycetae*: peridium; gleba; capillitium; flocci; sporae.

Uredinaceae: sorus; teleutosorus; uredosorus; teleutosporae; mesosporae; uredosporae; pseudoperidium; aecidiosporae; caeomosporae; epiteosporae.

Ustilaginaceae: sorus; sporae.

Phycomycetae: oogonia; oosporae; antheridia; sporangia; zygosporae; azygosporae; zoosporangia; zoosporae; conidiophora; conidia.

Pyrenomycetae and *Phymatosphaeriaceae*: stroma; perithecium; loculus; ascus; sporidia; paraphyses.

Discomycetae and Tuberoideae: ascoma; gleba; ascus; sporidia; paraphyses.

Schizomycetae: filamenta; baculi; cocci, endosporae; arthrosporae.

Sphaeropsidaceae: stroma; pycnidium; basidia; sporulae.

Melanconiaceae: acervulus; basidia; conidia (not gonidia, which are altogether different, and belong to the Lichens).

Hyphomycetae: caespitulus; sporodochium; hyphae; conidiophora; conidia.

Obs. From the spore, in the broad sense, arise by germination a promycelium, which produces sporidiola (not sporidia, as many say)."

Approved subject to the following alterations. Myxomycetae should be expunged in favour of the term Mycetozoa which more nearly indicates the doubtful nature of these organisms. Omit flocci under Gastromycetae. To Phycomycetae add sporangiophora, and columella. In Discomycetae use spore instead of sporidia. And in Sphaeropsidaceae and Melanconiaceae omit basidia.

VIII. "Fungi imperfecti, or *Deuteromycetae*, are to be cited and described along with their perfect stages (if these are clearly indicated). They should also be described separately in systematic works under their own name and with their form relatives, or at least cited there, with a reference to the place where they are described with the perfect forms.

"The advantage of describing separately all the forms of imperfect fungi arises from the fact that we are entirely ignorant of the perfect stages to which the vast majority of this immense group belong, and that these forms are for the most part widely removed from the perfect stage, whence the great difficulty of determining whether one form or another has already been described (without a name) under its perfect stage. From this rule should be excepted species of the genus *Uredo*, which are most frequently associated with the teleutospore stage (*Uromyces*, *Puccinia*, &c.), with which alone they should be described. But species of *Aecidium*, *Epitea*, *Caeoma* and *Aecidiolum* are to be described or at least cited separately. Conidial stages of *Peronospora* and *Cystopus* are to be described but once, in connection with the perfect stages."

Approved.

IX. "The names of fungi which do not show metagenesis should conform to the rules of nomenclature for other plants, but the metagenetic *Uredinaceae* and *Ascomycetae* should follow especial rules."

Approved.

X. "The proper name of one of the *Uredinaceae* is that applied to the teleutospore stage, the secondary name is that given to one of the earlier stages (*Uredo*, *Epitea*, *Caeoma*, *Aecidium*, *Aecidiolum*). Moreover, when the name of an earlier stage of any species is found to have been published before the name of the correlated perfect stage, it is not permissible to transfer the name of the imperfect stage to the perfect one upon

the plea of priority, unless the former is found to comprise the perfect stage also, as often happens in *Uredo*, with respect to species of *Uromyces*, *Puccinia*, *Coleosporium*, &c. When we wish to transfer the name Aecidium to the teleutospore stage, as formerly permitted, we act directly contrary to the facts. Of many examples, two will suffice. 1, When we change the name *Puccinia Caricis* Reb. (1804) to *P. Urticae* (Schum.) Lagerh., because the name of the aecidial stage (*Aecidium Urticae* Schum., 1803) is earlier, we make two misstatements, namely, that Schumacher knew and distinguished *Puccinia Caricis*, which he did not, and that this Puccinia grows upon *Urtica*, which nourishes no *Puccinia*. 2, When we change the name of the extremely common *Puccinia graminis* Pers. (1797) to *Puccinia poculiformis* (Jacq.) Wetts, because the name of the aecidium is prior (Lycoperdon poculiforme Jacq. 1783), we likewise make two false statements, namely, that Jacquin knew and distinguished *Puccinia graminis*, and that this assumes the form of a cup, a form which it does not exhibit."

Approved.

XI. "As to the heteroecious species of *Uredinaceae* recently distinguished, the names proposed by Klebahn, Arthur, and others, based upon the two hosts, merits approval; with this condition, however, that the specific name be composed of not more than two words, and that the host of the teleutospore stage hold first place in the name, the host of the aecidium second place. Thus: *Puccinia Pseudocyperi-Ribesii*, not *P. Ribesii Pseudocyperi* Kleb. *Melampsora Populina-Allii*; not *M. Allii-Populina* Kleb.

Approved.

XII. "What has been said of the nomenclature of *Uredinaceae* is valid for *Ascomycetae*. Thus, for example, it is incorrect to write *Glomerella rufo-maculans* (Berk.) Schrenk & Spaulding, because the conidial stage is *Septoria* (*Gloeosporium*) *rufo-maculans* Berk. (1854), as Berkeley neither saw nor described the ascus bearing stage. It is, however, correct to write *Glomerella fructigena* (Clinton) Sacc., for the ascophore is *Gnomoniopsis fructigena* Clinton 1902."

Strongly approved because this addition will prevent a strict adherence to rule V. involving such an absurdity as placing *Ctenomyces serratus* Eidam under *Arthroderma Curreyi* Berk. (1854) and later E. S. Salmon, whereas neither Berkeley or Salmon knew it as an Ascomycete but considered it to be a Hyphomycete and it was subsequently republished as *Arthroderma Curreyi* by A. L. S. in the issue of these Transactions for 1903, p. 60.

XIII. "Adjectival specific names should agree in gender with the name of the genus. Hence the names *Glomerella cinctum* (B. & C.) Spauld. & Schr., *G. piperatum* (E. & Ev.) Spauld. & Schr., *Puccinia hibisciatum* (Schw.) Kell., thus formed because the imperfect stages are of the neuter gender (*Gloeosporium* and *Aecidium*), are to be rejected, as well as for the reason that the authors cited within parentheses knew only the imperfect stage, which is altogether different from the perfect. The name *Nummularia nummularium* (Bull.) Keissl. Krypt. exsicc. Vindob. no. 516 (1900) is likewise to be rejected, both on account of tautology and the difference in gender."

Approved.

RECENT RESEARCHES ON PARASITISM.

By R. H. Biffen, M.A.

The scientific study of parasitism dates from the year 1866, when De Bary's *Morphologie and Physiologie der Pilze*, etc., containing the results of researches carried out between the years 1853 and 1863, was published. With rare exceptions, amongst whom we must mention Berkeley and Kuhn, most authors before this period vaguely supposed that the parasitic fungi were the hypertrophied cells of the host plants or even their cell-contents such as chlorophyll grains. De Bary, by means of infection experiments, gave us in this work the first clues as to the actual relations of the host plant and the parasite, and marked out, once for all, the lines along which subsequent investigations have been carried out. Within the last forty years the experimental methods he adopted have been widely applied, with the result that our knowledge of parasitism has increased with a rapidity which on looking backwards is little less than amazing. Instead of an isolated worker here and there there are now many adding almost daily to our knowledge of the subject. We now have special journals devoted solely to the publication of their researches and, what is perhaps more remarkable still, the economic value of such studies has been realized and we are frequently in a position to combat the attacks of parasites on the wholesale scale.

Amongst all of the researches carried out in this period those of Eriksson embodied in his *Die Getreiderost*, 1896, stand out from all others and mark a fresh starting point second in importance only to De Bary's. This work has opened new and unexpected fields, which have already been worked with con-

siderable profit and give promise of still more valuable harvests to come. It may well serve us as a starting point in reviewing briefly the progress recently made.

Eriksson's primary object was to investigate the rusts of the cereal crops and determine whether anything could be done to check the enormous losses they cause year by year. There were some four species recognized by mycologists on the cereals wheat, barley, oats and rye, but Eriksson showed that in Sweden there were at least ten forms of rust to be reckoned with on these host plants. Taking, for instance, the single species *Puccinia graminis*, this was known on the various cereals and on a hundred of the native grasses and it was supposed that the fungus could pass indiscriminately from any one host to the other. By a long series of infection experiments Eriksson showed that this was by no means the case. If for instance the uredospores of *P. graminis* were taken from oat-plants they failed to reproduce the rust on rye, barley, or wheat; similarly if taken from meadow grass (*Poa pratensis*) they were incapable of infecting these same cereals. Thus this single species could be broken up into a series of races such as *P. graminis secalis*, *P. graminis tritici*, *P. graminis avenae*, *P. graminis poae*, etc., the infecting powers of which were confined to certain groups of plants. For the first time then we realized that the spreading of these parasites from wild to cultivated host-plants was not as widespread as we had believed, and it was also clearly proved that, with exceptions we need not describe here, the spreading from one cereal to another did not occur. These specialized forms of *P. graminis* have received various names. They are frequently described as "biologic species," for from a physiological point of view they are obviously distinct species, but systematists who can make use of external characteristics only for delimiting the species can hardly look upon them as such, as morphologically they are identical with one another. We may therefore compromise and call them "biologic forms."

The distinctness of these biologic forms is further emphasized by the fact that the aecidiospores they give rise to on the barberry have the same restricted powers of infection. If, for instance, the aecidiospores result from an infection with the form from wheat they are incapable of reproducing the rust on barley and so on.

Other researches have proved the accuracy of Eriksson's work and shown also that this specialization of fungi to particular host-plants is a phenomenon by no means confined to the rusts of the Gramineae but that it is probably of very general occurrence. Thus it is known in other Uredineae and in such Ascomycetes as *Claviceps*, *Exoascus* and *Erysiphe*. The researches of Neger, Salmon and Marechal have made our knowledge of the

biologic forms of the Erysiphe almost as complete as it is in the case of the rusts of the Gramineae. The widely distributed species *Erysiphe graminis*, for instance, has been shown to be an aggregate of distinct biologic forms. The form on wheat refuses to infect normally growing barley, that on barley (*Hordeum sativum*) will not infect *H. sylvaticum* and so on, and further they have proved to be as distinct from one another in the ascus stage as they are in the conidial stage.

In this particular direction we have reached closely to the limits of human knowledge, and looking beyond we can see more or less clearly that a closer study of this subject from a physiological point of view, will give us some clue as to the conditions obtaining both in the host plants and the parasites which have led to this singular separation of biologic forms within single species. In this connection the discovery of "bridging species" by Marshall Ward is of unusual interest. The experiments were carried out with a biologic form of *P. dispersa* occurring on various species of the genus Bromus, and resulted in the proof that the fungus might infect a host plant A but be incapable of infecting a second species B, yet B might be infected by spores of the same fungus produced on a third species C from a sowing of spores from A. The species C then acts, from the point of view of the fungus as a bridge between A. and B., enabling it indirectly to bring about infection where direct infection is impossible. Following this Salmon has proved that bridging species exist, again amongst the Bromes which permit of the indirect passage of a biologic form of *Erysiphe graminis* from one host to another where direct infection is impossible. The spreading of parasitic fungi is not so sharply restricted then between certain host-plants as at first sight it appeared to be. These results point to the fact that some change in the constitution of the parasite itself is brought about solely by its temporary sojourn on a different host plant since then it can bring about infection where it could not before. How this change is effected or what it really is we cannot say, for we know nothing of the factors determining constitution in either host or parasite. Further than this it has been shown by Salmon that under certain conditions a given biologic form can be induced to infect hosts normally perfectly immune to its attacks. This has been accomplished by lowering the vitality of groups of cells in the leaves of the plant by such drastic methods as bruising, cutting, burning, treating with anaesthetics and so on. After such treatment the injured portions of the leaves of barley become slightly susceptible to the attacks of *Erysiphe graminis* growing on wheat, in spite of the fact that the fungi on wheat and barley belong to sharply distinct biologic forms. The fungus is capable of getting such a hold on the

injured tissues that it can give rise to fresh crops of conidia, but these conidia are not capable of infecting normal barley foliage. Putting the matter crudely we may say that their temporary sojourn on barley has not sufficiently altered their constitution to make them capable of attacking it directly—it can still only respond to wheat, its normal host.

Such considerations show clearly that the plant itself when growing normally has a capacity for resisting the infection of certain parasites and they lead one to ask whether by changing the external conditions under which the plant is growing this power of resistance can be altered, whether it can be increased or diminished? If in any way it can be increased those whose mission it is to combat fungoid attacks will have a powerful weapon placed in their hands. So far though we have little evidence one way or the other. Marshall Ward has shown that the condition of the plant as determined by starving it of certain food materials such as phosphates, nitrates, calcium compounds and so on, does not alter its liability to infection, but Hennings states that plants highly susceptible to the attacks of certain parasites become far less so when transplanted into richer soils. On the other hand it is generally believed that wheat, for instance, grown on rich soil is more susceptible to yellow rust than when grown on poor soils. A probable explanation of the latter phenomenon is that the fungus has greater stores of foodstuffs to draw upon in the former case and can consequently produce far more spores and so become more obvious.

The whole subject is rendered more complex by the fact that it does not follow that because a plant, say for example wheat, can resist the attacks of yellow rust it is immune to the mildew as well.

When one seeks for an explanation of the fact that of two very similar plants one may be highly susceptible to the attacks of a particular fungus and the other immune, the answers given are conflicting. Speaking of wheat and its rusts a recent textbook considers immunity to be due to such external characteristics as toughness of the epidermis (though infection takes place through the stomata) and the narrowness and erectness of the leaf-blade. It also states that early sown and early ripening varieties escape rust best. At first sight there is a superficial probability that these factors are of importance but a more detailed examination shows that they fail to carry the burden required of them. The one extensive histological examination made for this purpose by Marshall Ward has shown that the possibility or otherwise of infection occurring among the species of Bromus when inoculated with uredospores of the biologic form of *Puccinia dispersa* could not be correlated with such

characters as thickness of cuticle, the number of stomata per unit area, the hairiness of the leaves, etc. I may also add that some of the most susceptible wheats to yellow rust are characterized by their early habit of ripening. The factors which determine whether a plant will be immune or susceptible to any particular fungus are at present beyond the reach of our powers of observation. They are intra-protoplasmic and infection experiments alone can decide the matter. Where such infection trials are made with the uredospores of a rust they are found to push out a mycelium into a stoma, which develops rapidly in the intercellular spaces and drives its haustoria into the cells of the susceptible host plant. In the immune plant the mycelium fails to develop to any extent in the intercellular spaces and finally it dies away altogether. At the outset the possibilities of infection are the same for each, but the fungus fail to overcome the resistance of the cell walls and protoplasm of the immune plant and consequently dies for lack of food before it can obtain a footing. Why it fails we cannot say and can only ascribe it again to the constitution of the host plant, leaving what are probably complex problems in the metabolism both of the host and parasite for the future to decide. It may be, as has been suggested, that antitoxins in the host and toxins in the parasite are the deciding factors. In this connection we may note in passing that claims have been made, which require supporting, that certain plants have been rendered immune to the attacks of their usual parasite by being watered with solutions of copper sulphate.

The next portion of the subject which requires investigation is the external conditions responsible for epidemics, for rust-years, for potato-disease years, etc., for knowing what to expect it may be that precautions can be taken for checking their ravages. In certain cases we know something of these external conditions. Thus it is now universally agreed that epidemics of potato-disease (*Phytophthora infestans*) occur when moist, dull weather, and consequently a water-saturated atmosphere, follow a forcing period of growth in July and August. Such conditions one can readily realize are peculiarly favourable for the rapid development and distribution of the zoospores of the fungus, whilst it is possible that they, to a certain extent, break down the host-plant's capacity for resistance by disturbing its normal economy. One need only remember that under such conditions the plant would tend to become water-logged, owing to imperfect transpiration, to see how such disturbances would be possible. That the same external conditions are favourable to the spread of all parasitic fungi is highly improbable. A rust-epidemic and a mildew-epidemic are not necessarily found in the same season on a barley crop, though these fungi make

their appearance at the same time and are consequently exposed to the same external conditions. Generally the barleys suffer from mildew one season, and rust another, but we have not sufficient data so far to forecast which will be the more serious pest. Eriksson, to explain certain facts in connection with epidemics of yellow rust has been led to formulate his much-discussed "mycoplasm" hypothesis. The essential points of this are that the wheat grains themselves contain within some of their cells a portion of the protoplasm of the yellow rust. This fungus protoplasm, or mycoplasm, lives for a time symbiotically with its host, but under certain external conditions it is supposed to be capable of further development, resulting in the production of the mycelium and finally of the spores of the rust. This conception of the handing on directly from the maternal parent to the offspring of the actual cause of disease has not met with general acceptance. It runs counter to all one's knowledge of heredity and one may now dismiss the subject, for it has been shown that Eriksson when attempting to demonstrate the actual mycoplasm and its development was misled, largely by faulty technique.

We may say definitely that we know of no well authenticated case where disease can be transmitted in this way, but we do know definitely that the tendency or the liability to disease is inherited, and, that given suitable conditions, the plants will certainly become diseased. Many examples might be quoted but I must content myself with a few. If we take four barleys, *Hordeum spontaneum*, *H. violaceum*, *H. japonicum*, *H. hexastico-furcatum*, and keep them under observation season by season, the first will be found practically immune to the attacks of *Erysiphe graminis*, whilst the remaining three will show gradually increasing degrees of virulence in the attacks of the parasite in the order quoted. In the same way wheats such as Engrain commun are always practically rust free, whilst Michigan Bronze is badly infected. Such facts bring us back once more to the "constitution" of the plant. Some, from this point of view, are sound, others are wanting, and we look forward to the time when we shall be able to say why this should be so and give those who are responsible for our crops further aid in, what is rapidly becoming a pressing problem, the raising of disease-resistant races.

CORTICIUM (PENIOPHORA) CHRYSANTHEMI

By Charles B. Plowright, M.D.

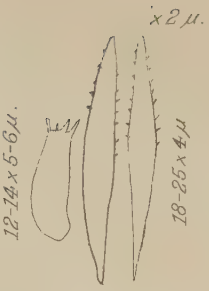
With Plate 6.

Some five-and-twenty years ago I planted a number of Chrysanthemum plants on the south side of a wall in a small strip of freshly broken up garden ground in King's Lynn. Chrysanthemums in those days were not what they are now and the varieties planted were intended to be permanent ornaments, of the garden. In the course of a few years they died off, one after another. On examination of the plants it was observed that in each case a white fungus growth was present on the lower part of the stems. This growth resembled a splash of white-wash. It was not confined to the stems but extended into the adjacent soil. At first it was regarded as some form of white mould of a saprophytic nature, for at that time but little was known of the parasitic character of the Hymenomycetes. For several years attempts made to grow Chrysanthemum plants in this garden failed. Closer examination and more careful watching made it evident that the fungus was a Corticium bearing a close external resemblance to *C. sambuci*. Its fullest development was attained upon the base of the stems. It never extended far upwards above the ground level and it was noted that the white hyphæ not only matted the particles of earth together but that they extended in many cases from stem to stem. Plants once attacked did not survive beyond the second year.

The young green shoots sent up by affected plants in the autumn are shorter in height and thinner in the stem. Experience shows that when once a plant is attacked it is of little use attempting to remove the healthy portions and induce them to grow for the ensuing season's blossoms. They almost invariably succumb within the year. During the autumn of 1904 the disease was met with in two other gardens in the town, which led to its more careful examination, as a fungus of such destructive capabilities cannot fail to be interesting to horticulturists.

The stroma of the hymenophore is lax, the individual hyphæ being easily demonstrated in a section, especially upon its lower surface. When growing in living bark they can be seen to pass between the cells of the host.

The hymenium is smooth to the unaided eye but irregular



Basidium and Cystidia.

Spores 5-6 × 4-5 μ.

C B P & E A R del. West, Newman chromo London.

Corticium (Peniophora) Chrysanthemi *Plow.*

owing to the unevenness of the matrix. A microscopic section shows it to be thickly studded with cystidia. Most of the cystidia are surmounted by a globular apical expansion 2 to 3 μ across. The whole cystidium averages from 20 to 25 μ in length, from 10 to 15 μ of which project above the surface of the hymenium. The basidia are peculiar in shape, being much flatter above where they bear four, rarely two, sterigmata. The whole basidium measures from 12 to 15 μ in length by 5 to 6 μ in diameter. The spores are colourless, oval, 5-6 × 4-5 μ, with large, very apparent nuclei.

The capitate cystidia, the flat-topped basidia and the large nuclear spores render this species easy of recognition microscopically. To the naked eye the dead white hymenium on the living and dead stems at their ground level, the matting of earth by the hyphæ of the fungus, and the attenuated shoots of the affected plants show the gardener at once what he has to deal with. The only treatment is burning the diseased plant. It is useless to separate the apparently healthy shoots.

Specimens of the fungus have been deposited in the Herbarium of the British Museum and have been placed next Peniophora terrestris Mass.

Corticium (Peniophora) Chrysanthemi.

Hymenium chalk white, effused, incrusting, indeterminate, uneven from the irregularities of the matrix, substratum filamentous. Spores hyaline, oval with large nuclei 5-8 × 3-5 μ. Basidia flattened at the summit 10-15 × 5-6 μ, bearing four, rarely two, sterigmata. Cystidia numerous, 18-25μ × 4-5μ, projecting from 10-15 μ above the surface of the hymenium with a spherically dilated apex about 3μ in diameter.

Parasitic at the base of living Chrysanthemum stems, autumn.

NOTES ON THREE UNCOMMON FUNGI.

By Cecil H. Sp. Perceval.

Agaricus (Pleurotus) corticatus Fr.

On dead beech at top of the Dene Lane, Longwitton, Nov. 1902 and 1904.

Agaricus (Pleurotus) serotinus Sch.

On dead horsechestnut in Longwitton Garden House field, Nov. 13, 1904.

Polyporus umbellatus Fr.

On the ground, in a wood on the north bank of River Hart, on the N. side of footpath, a little to the E. of the gully out of the Wittonstone field, Longwitton, 26 August, 1904. It was also found by me, at the same place several years ago, when I failed to identify it. Although I have often looked for it since, at the same place, I have never seen it again until last August. These are the only two specimens I have ever met with. It grows in a cluster of roundish outline reminding one at the first glance of *Sparassis crispa*. It is very brittle, and very soon perishes. On each occasion I sent the specimen away by post, the day after I found it, and each time it arrived like a handful of wet sawdust.

The pileoli are rather scaly, very much waved, and thin; the pores extend all down the stem, and are variable in form, here and there elongated.

The spores have much the same outline as that of a grain of wheat.

FUNGI NEW TO BRITAIN.

By Annie Lorrain Smith, F.L.S., and Carleton Rea, B.C.L., M.A., &c.

WITH PLATES VII., VIII. & IX.

Mortierella pilulifera van Tiegh. Ann. Sci. Nat., Series 6, Vol. I., p. 105, tef. 11, figs. 63-69.

Sporangiophores solitary, upright, unbranched, septate when mature, especially towards the base, surrounded at the base with short swollen terminal hyphae at first filled with protoplasm, then empty and brown-walled; 5 mm. high, cylindrical, slightly swollen at the base and slightly broader beneath the sporangium, colourless, and stiff; sporangia globose always colourless, poly-spored, the basal collar absent or very minute, the tip of the sporangiophore slightly convex and marked with a shining spot; spores elliptical 7-9 × 4-5μ smooth, colourless; conidia globose, echinulate, on short non-septate stalks.

On rabbit dung, Whitby, September, 1904.

The specimen grew on some pellets of rabbit dung, kept in a moist atmosphere for a week or two. The stalks were markedly

septate, firm, and upright, but I did not find the swollen basal hyphae. The spores were also distinctly smaller, 6 × 3μ or even somewhat less. It seems preferable to record it under the above species as *Var. parvispora* A.L.Sm.

Melanospora lagenaria Fckl. Sym., p. 126.

Perithecia scattered or gregarious, globose or somewhat ovate, slightly wrinkled, sparingly hirsute, furnished at the base with numerous yellowish hyphae, soft, at first yellowish brown becoming blackish, about $\frac{1}{2}$ mm. in diameter, the beak $2\frac{1}{2}$ mm. in length, rather bent, fringed at the top with white hairs; asci broadly clavate, stalked 35-40 × 12-15μ, 8 spored; spores elliptical, pointed at the ends, brown, 11-14 × 6μ.

On decaying *Polyporus*, etc.

Found by W. Williams on decaying fungus (Stereum?) in Bushey Park, Middlesex, November, 1904.

Calonectria vermispora Mass, and Crossl. Naturalist, January, 1904, p. 4.

On a decorticated fallen trunk, Hardcastle (Coll. J. Needham, November, 1897).

Venturia Thwaitesii Mass. and Crossl. Naturalist, January, 1904, p. 3.

On dead stems of wild Raspberry.

Dilophospora albida Mass. and Crossl. Naturalist, January, 1904, p. 3.

On dead stems of Epilobium hirsutum, Lee Mill Road, Hebden Bridge (Coll. J. Needham, August, 1890).

Gnomonia Needhami Mass. and Crossl. Naturalist, January, 1904, p. 3.

On dead fir leaves, Crimsworth Dean, Hebden Bridge (Coll. J. Needham, May, 1897).

Stictis sulfurea Rehm, Rabenhorst's Krypt. Flora, Bd. 1, Abth. 3, p. 177.

Apothecia gregarious, at first closed, globose, immersed then bursting the bark and opening finally with a margin of 4-5 reddish yellow lobes; the disc white, furfuraceous, then sulphur yellow $\frac{1}{2}$ to $1\frac{1}{2}$ mm. broad; asci cylindrical, thickened at the apex 100-120 × 8-9μ,8 spored; spores elongate, pointed, mostly

straight, multiseptate, 75-80 × 4-4·5 μ; paraphyses thread-like, straight, colourless.

On a decaying oak-branch.

Coll. by W. Williams on a bit of bark, Bushey Park, Middlesex, November, 1904.

Coryne aquatica Mass. and Crossl. Naturalist, January, 1904, p. 6.

Gregarious, among moss on a boulder in a stream. Egton Bridge, Y.N.U. Foray, September, 1902 (Coll. G. Massee).

Sphaerospora citrina Mass. and Crossl. Naturalist, January, 1904, p. 4.

On peaty ground, Redcar. (Coll. E. M. Holmes, September, 1901).

Dasyscypha laetior (Karst.,) Sacc., Syll. Fung., viii., p. 441.

On dead wild Raspberry canes, Midgehole, Hebden Bridge, May, 1899 (Coll. J. Needham). Masham, July, 1902 (Coll. W. A. Thwaites). Naturalist, January, 1904, p. 5.

Peziza recedens Boud. Bull. Soc. Myc., France, 1898, p. 18, tab. v., fig. 1.

On the cortex side of a tub-garth, partly lying in a stagnant pool, Halifax. (Coll. C. Crossland, July, 1892). Naturalist, January, 1904, p. 4.

Durella melanochlora Rehm., Ascom. Alp. No. 27.

On decorticated Alder. Heptonstall (Coll. Crossland and Needham, June, 1899), Naturalist, January, 1904, p. 6.

Phoma caulographa Dur. and Mont., Mont. Syll. No. 978.

On dead stems of *Chaerophyllum temulentum.* Canal bank, near Elland (Coll. H. T. Soppitt, January, 1898). Naturalist, January, 1904, p. 6.

Symphosira parasitica Mass and Crossl. Naturalist, January, 1904, p. 6.

Parasitic on the fallen mericarps of *Conium maculatum.* Sutton, near Askern (Coll. A. Clarke and C. Crossland at the Sutton Y.N.U Foray, September, 1899.

Tricholoma horribile Rea, see Pl. 7.*

Pileus, fleshy, 10-12 cm. broad, convex, then expanded, densely covered with dark fuscous squamules, which become

*This plate has been kindly given by the Rev. W. L. W. Eyre as a donation to the printing Fund.

F. A.Rea. del. West,Newman chromo London.

Tricholoma horribile *Rea.*

squarrose with age, especially at the centre, and the whole pileus becomes tinged *with a pink background at maturity*, margin thin exceeding the gills. Stem 8-9 cm. long, by 2 cm. thick, incrassated at the base, white, hollow, smooth. Flesh thin, white *becoming pinkish, everywhere covered with fuscous spots*, which on the interior of the pileus suggest as if the squamules had been rivetted through the depth of the flesh. Gills emarginate 2 cm. wide, crowded, margin uneven, whitish, *becoming pinkish with age.* Spores white, globose × 5 μ. Easily distinguished from its allies by the plant everywhere (with the exception of the exterior of the stem), turning pinkish with age and by the fuscous spots in the interior of the stem and pileus.

Under Beech trees, Swarraton, Hants., 31st October, and 2nd November, 1903, Revd. W. L. W. Eyre.

Entoloma Farrahi Mass. and Crossl. Naturalist, January, 1904, p. 1, pl. 1, figs. 1-4.

Among short grass on "The Terrace overlooking Rievaulx Abbey, Helmsley." (Coll J. Farrah, F.L.S., at the Y.N.U. Fungus Foray, 1903). "Differs from all allies in the smooth elliptical spores."

Nolanea papillata Bres. t. 82, f. 1, N. mammosa var. minor, Fr. Ic., t. 98, f. 4. Batsch f, 5, Cke. Illus. t. 377, f. 2.

Pileus 2-3 cm. wide, submembranaceous, subcampanulate, convex, then expanded, *papillate*, striate, fuscous-bay, somewhat cinnamon colour when dry. Stem 4-5cm. long, by about 2mm. thick, fistulose, glabrous, *shining*, obsoletely white-mealy at the apex, white tomentose at the base. Flesh concolourous. Gills 3-5 mm. wide, somewhat crowded, livid white, becoming fuscous flesh colour, sinuato-adnate. Smell pleasant, but often very faint and sometimes absent. Spores 5-7 angled 8-11 × 6-7μ.

Iburndale, Yorkshire, 15th September, 1904.

Inocybe lanuginosa (Karst.) Mass, Massee Monograph of the genus Inocybe, Annals of Botany, 1904, p. 468 and 469.

"The spores are irregularly oblong, apiculate, with somewhat acute warts, 9-12 × 8μ. In Brit. Fungus Flora, II., p. 183, the spores are incorrectly said to be smooth."

Inocybe calospora Quél. in Bres. Fung. Trid., I., p. 19, t. 21; Sacc., Syll. v. p. 773; I. rigidipes Peck., 51 Rep. State Mus., p. 289 (1897), l.c., p. 469.

Pileus convex or campanulate, then expanded and umbonate, fibrillose with darker squamules at the disc, yellowish brown or

tawny grey, edge paler, 1·5-2·5 cm. Gills sinuate, almost free, tawny-ochre or brownish. Stem slender, pale, then reddish or coloured like the pileus, 4-5cm. Spores globose, with numerous rather long, slender, cylindrical papillae, 10-12 μ. Cystidia not numerous, subcylindrical or slightly fusiform 45-55 × 11-14 μ. On the ground in woods and shady places. Britain (Wothorpe).

Inocybe Bucknalli Mass. l.c., p. 473.

Pileus campanulato-convex, fibrillose, with a few squamules near the disc, brownish, 1-2cm. Gills adnexed, thick, rather distant, rusty-brown, edge minutely fimbriate. Stem equal or slightly thickened at the base, slender, fibrillose, brownish, 2-4 cm. Spores irregularly oblong, one end obliquely apiculate, rather coarsely nodulose, 15-17 × 8-9 μ. Cystidia absent. *Basidia* clavate, *exceptionally large*, 70-80 × 16-18 μ, 4-spored. On the ground under bushes. Britain (Leigh Down, Bristol. Cedric Bucknall).

Inocybe cervicolor Quel., Fl. Myc., p. 107; *Ag. cervicolor* Pers., Icon. Pict. Rar. Fung. t. 8, f. 4 (1803-1806), Mass, l.c., p. 479.

Pileus campanulate, pale brown or fawn-colour, covered with brown, recurved fibrils, 3-5 cm. Gills emarginate, ventricose, distant, pale then rusty brown, margin whitish, denticulate. Stem elongated, firm, whitish, fibrillose, with brown recurved filaments throughout its length, 6-9 cm. Spores elongate, pip-shaped, smooth, 11-13 × 6-6·5. Cystidia cylindric-fusoid, numerous, 40-50 × 12-18 μ. Flesh white, tinged purplish when cut. Smell strong, unpleasant. Among grass in woods. Britain.

Inocybe Godeyi Gillet, Champ. Fr., Hym., p. 517 (1874); Sacc., Syll. v. p. 778; *Ag.* (*Ino.*) *Trinii* Pat., Tab., Anal., n.345; and *Ag.* (*Ino.*) *Trinii* var. rubescens, n. 344; *I. rubescens* Gill., Rev. Myc., v., p. 31 (1883); and Champ. Fr. Hym. with plate, and described in the general index (1897); Sacc., Syll. v., p. 786; *Ino. Trinii* Bres. (non Weinm), Fung. Trid., II., p. 14, t. 120; *Ino. repanda* Quél (non Bull.), Flor. Myc., p. 101 (1888); *Ino. hiulca* Kalch., p. 33, t. 20, f. 2; Sacc. Syll. v., p. 774. Mass. l. c. p. 481, and see pl. 8 hereof.

Pileus campanulate, obtusely umbonate, silky-fibrillose, rimose, whitish at first, then more or less suffused with a rosy tinge, which is usually accompanied by an ochraceous tinge, margin splitting, 3-5 cm. Gills narrowed behind and adnexed, almost free, somewhat crowded, whitish then dusky cinnamon, usually with an olive tinge, edge white, minutely flocculose. Stem equal, slightly bulbous, colour of the pileus, apex white-pruinose,

Inocybe Godeyi *(Gillet) Mass.*

Inocybe fulvella *Bres.*

4-6 cm. Spores elliptical, slightly curved or subreniform, smooth, 9-12 × 5·5-6 μ. Cystidia ventricose, 40-65 × 15-20 μ, fairly numerous. Smell strong, unpleasant.

On the ground in woods, &c., Britain.

One of the larger species of Inocybe characterized by the pileus and stem being either pure white, or nearly so, and silky when young. As the fungus advances in age rosy-red or ochraceous-rosy stains appear on the pileus and stem. These tints are also produced when the plant is bruised.

Inocybe mimica Mass. l.c., p. 492.

Pileus campanulate, obtusely umbonate, fibrillose yellow-brown, everywhere covered with large, adpressed, slightly darker fibrous scales, 6-8 cm. Gills broad, deeply sinuate and attached to the stem by a very narrow portion, yellow-brown. Stem solid, equal, fibrillose, paler than the pileus, 6-8 cm. long, 1 cm. thick. Spores subcylindrical with an oblique apiculus, smooth, 14-16 × 6-8 μ. Cystidia absent.

On the ground in woods. Britain (Castle Howard, Yorks., September, 1892). The pileus exactly mimics that of Lepiota Friesii, as figured in Cooke's Ill., p. 941, hence the specific name.

Inocybe fastigiata (Karst.) Mass., l.c., p. 495.

"The spores are elliptical, sometimes slightly curved, smooth, 8-11 × 6-7μ Cystidia absent." "In Brit. Fung. Flora II., p. 192, not having an authentic specimen, I copied Saccardo's account of spores and cystidia."

Agaricus plumosus Bolt., Mass. l.c., p. 500., Bolt. pl. 33 (1788).

Massee is "inclined to think that the fungus Bolton had in view was a species of *Collybia* of the section Vestipedes."

Inocybe violaceafusca Cke. and Mass., l.c., p. 501.

This proves to be a *Cortinarius* and will thus become C. (Dermo.) violaceo-fuscus Cke. and Mass.

Inocybe tricholoma A. and S., Mass., l.c., p. 501.

"This has been correctly referred to Flammula by Karsten,* on the label to Kart. Fung. Fenn., exs. 412."

Inocybe phaeocephala (Bull.,) Fr. Mass., l.c., p. 501., Cke., Ill., pl. 396.

Massee finds "no justification for the retention of this species

*Fries placed it in Flammula in his Monographia, Vol. I., p 350.

in *Inocybe*. It was first placed there by Fries, who never saw what he considered to be that species, but drew up his diagnosis from Bulliard's figure, adding a rider to the effect that its position is doubtful. Cooke's description with a 'smooth pileus' and 'bright ferruginous spores' certainly does not suggest *Inocybe*."

Inocybe schista Cke. and Sm. Mass., l.c., p. 501., Cke., Ill., pl. 504.

"A species founded entirely on a sketch, which may or may not have been accurately done in the first instance."

Coprinus aquatilis Peck.

Among decaying leaves of *Luzula sylvatica*, moss, twigs, etc., in swamp, High Lee Clough, Norland, Halifax, June, 1900. Naturalist, January, 1904, p. 2.

Marasmius lagopinus Post., in Fr. Hym. Eur., p. 474.

Duncombe Park, Helmsley, Y.N.U. Fungus Foray, October, 1903. (Coll. Messrs. Needham and Thwaites). Naturalist, January, 1904, p. 2, pl. 1, figs, 8-10.

Clavaria tenerrima Mass. and Crossl. Naturalist, January, 1904, p. 2.

Among short grass, Halifax. (Coll. C. Crossland).

Pistillaria pusilla Fr. Syst. Myc., 1, p. 498, Hym. Eur. p. 688. Reinke in Berthold, Zersetz. d. Kartoffel, 1879, pl. vi., figs. 12-4.

Small, linear, tapering, white up to $\frac{1}{2}$ or 1 cm. in height, stalk scarcely distinct; basidia 2-spored; spores $10 \times 4\mu$., colourless.

On dead leaves from Southampton, February, 1904.

Lycoperdon depressum Bon. Bot. Zeit. 1857, p. 611, and see pl. 9 hereof.

Peridium $2\frac{1}{2}$-3 cm. high by 3-5 cm. wide, obconic, at first rounded at the two ends, then becoming flattened on the top, often compressed at the sides, more or less contracted at the base and plicate; yellowish white, then greyish yellow and finally brownish; covered with spinulose warts which are united at the apex, intermixed with minute simple spines and furfuraceous granules, all of which wear away with age; dehiscing by a well defined apical aperture which soon extends until the whole of the upper portion of the peridium disappears. Sterile base well developed, cellular and *separated from the fertile portion by a well defined diaphragm;* Capillitium copious, threads branched, *colourless*, flexuose, rough, up to 6μ wide; Spores globose, smooth, olivaceous $\times 4\mu$.

Inocybe brunnea *Quél.*

Lycoperdon depressum *Bon.*

Easily distinguished amongst the smaller Lycoperda by the presence of a well developed diaphragm between the sterile and the fertile tissue, and the colourless capillitium, it resembles L. caelatum in having a diaphragm, but it is constantly smaller, and the armature of the exoperidium is very different.

Amongst short grass, Kempsey Common, Worcestershire, 22nd August, 1903; Tickwood, Salop, 6th September 1904; New Forest, 25th October, 1904, and Lyme Regis, Dorset, C. Rea. Probably common, but hitherto overlooked.

MYCETOZOA.

Badhamia populina A. and G. List. Journ. Bot. xlii., (1904), p. 129, pl. 459, fig. 1.

On bark of old prostrate stem of Populus, Epping Forest. (Coll. T. Petch, November, 1902).

B. foliicola List. Tom. cit., xxxv. (1897), p. 209.

On brushwood, etc., Chigwell Lane and Leytonstone, Essex, and also collected in East Yorkshire by T. Petch. Tom. cit. xlii., p, 129.

B. decipiens Berk.

On wood, moss, etc., Tansterne, Yorks. Coll. T. Petch, August, 1903, Tom. cit. p. 130.

B. rubiginosa Rost. var. *globosa* A. and G. List. Tom. cit. p. 130.

On mosses, Llan-y-Mawddwy, N. Wales. Also a specimen in Wilson's Herbarium from Clough, Cheshire, November, 1854.

Trichia lutescens List. Sym. Oligonema furcatum Bucknall.

On a rotten plank, North Cave, East Yorkshire, T. Petch. Abbots Leigh, C. Bucknall. Tom. cit. p. 136.

Oligonema flavidum Peck.

On mossy Alder log, Horsham, Sussex, August, 1902. Miss A. Hibbert-Ware. Tom. cit., p. 137.

Perichaena variablis var. *pedata* A. and G. List.

On dead leaves, Lyme Regis, April, 1902. Tom. cit., p. 139.

OFFICERS FOR THE SEASON 1904.

President: Worthington G. Smith, F.L.S., 121, High Street South, Dunstable.

Vice-President: Professor H. Marshall Ward, D.Sc., F.R.S., &c., University Botanical Laboratory, Cambridge.

Hon. Secretary and Treasurer: Carleton Rea. B.C.L., M.A., &c., 34, Foregate Street, Worcester.

Published 13th May, 1905.

THE HASLEMERE FORAY.

25th to 30th September, 1905.

The ninth annual week's Fungus Foray was held at Haslemere by invitation of the Haslemere and Hindhead Microscope and Natural History Society and Professor Jonathan Hutchinson, LL.D., F.R.S., D. Sc., F.R.C.S., most kindly placed his Educational Museum at the disposal of the Society for its use as the headquarters during the meeting. On the afternoon of Monday, the 25th of September, Dr. Jonathan Hutchinson received the members on their arrival at the headquarters and courteously conducted them over his very interesting museum and later in the evening, the following specimens were placed out on exhibition by Mr. W. B. Allen from the neighbourhood of Benthall, Salop. *Lepiota lenticularis* (Lasch.), *Inocybe obscura* (Pers.), *Inocybe rhodiola* (Bres.) Mass. (New to the British Fungus Flora), *Lactarius insulsus* Fr., *Lactarius helvus* Fr., *Boletus candicans* Fr., *Boletus felleus* Bull., the rare *Hydnotrya Tulasnei* B. & Br.† and *Rhizina undulata* Fr., by Mr. E. W. Swanton from the vicinity of Haslemere *Trametes Bulliardi* Fr., *Tremellodon gelatinosum* Pers. *Polystictus Montagnei* (Fr.) (first record for Britain gathered near Grayswood in 1898) and *Boletus parasiticus* Bull. on *Scleroderma vulgare* Fr. (collected by Mr. Chuter near Shottermill), by Mr. J. F. Rayner from the New Forest *Pleurotus acerinus* Fr. and *Stereum multizonatum* B. & Br. and from Bere *Russula chloroides* (Krombh.) Bres. and *Lycoperdon umbrinum* Pers., by the Hon. Secretary the first two British specimens of *Pleurotus decorus* Fr. which he had received from their fellow member, Mr. Angus Grant, gathered in the neighbourhood of Drumnadrochit and *Stropharia squamulosa* Mass.*

On Tuesday, the 26th of September, the members assembled at the Town Hall at 10 o'clock from whence they were driven in carriages‡ to Woolmer Forest, a distance of about seven miles. Here the woods and open heath lands were very carefully investigated, and on an examination of the bag at the end of the day, it was found to include *Collybia extuberans* (Batt.) Fr., *Cortinarius* (*Inoloma*) *bolaris* (Pers.) Fr., (*Dermocybe*) *orellanus*

† For an illustration of this rare species, see plate 11 hereof.

* For description see Trans. Brit. Myc. Society Vol. I. p. 23.

‡ The carriages were kindly provided by the Haslemere Natural History Society.

Fr., (*Hygrocybe*) *rigens* Fr.; *Polyporus Schweinitzii* Fr.; *Hydnum imbricatum* L.; *Sparassis crispa* (Wulf.) Fr., *S. laminosa* Fr. (first record for Britain) and *Claviceps microcephala* (Wallr.) which infested the grass *Molinia caerulea*. The return drive to Haslemere was commenced about 5 o'clock. In the evening, at 8.30 at the headquarters, the President (Mr. R. H. Biffen, M.A.,) presided over the annual election of officers for the ensuing year, Mr. Arthur Lister, F.R.S. was unanimously elected President; Professor H. Marshall Ward, D.Sc., F.R.S., &c., Vice-President, and Mr. Carleton Rea, B.C.L., M.A., Hon. Secretary and Treasurer. The Hon. Secretary read two invitations, one from Professor M. C. Potter, suggesting a meeting at Newcastle-upon-Tyne, where the Durham College of Science would place rooms at the disposal of the Society during the foray, and also the Natural History Society would throw open the museum and give the use of the Library and Committee rooms if required. The Duke of Northumberland and Lord Barrow would give permission to visit the park at Alnwick and at Raby (each about 30 miles from Newcastle) whilst Gilside and other woods were about 10 miles distant. The other invitation was from the Rev. H. Purefoy Fitz-Gerald, F.L.S., of Wellington College, Berkshire, urging the Society to visit that part of the country one year and that he would do all that he could to make the necessary arrangements. These invitations were carefully considered, but it was decided that as Mr. Arthur Lister had so very kindly consented to accept the position of President, that Epping Forest must be the scene of their Foray for 1906, the headquarters and date to be subsequently fixed by the President and Hon. Secretary after consultation with the Secretary of the Essex Field Club. The Newcastle invitation would very probably be acceptable for 1907 as a northern meeting would be desirable for that year and then probably the Rev. H. Purefoy's invitation to Wellington would be favourably considered for 1908, but the further consideration of these invitations must be deferred until next year. The Hon. Treasurer reported that the sum of £25. 12s. 8d. stood to their credit at the Post Office but that that amount included one subscription for 1906 and a payment of £1. 17s. 6d. by the United States Department of Agriculture in advance for the whole of Volume ii. of their Transactions.

On Wednesday, September 27th, the members were busy in determining the finds of the previous day up till 11 o'clock, at which hour they departed in brakes* through lovely scenery to Hindhead, where they descended at a place called the Land of Nod. Mrs. Arnold Lyndon met the members here and kindly acted as guide through Mr. A. T. Whitaker's woods in the neigh-

* The brakes were kindly provided by the Haslemere Natural History Society.

bourhood of Grayshott, but some of the older members could not keep up with the pace set by Mrs. Lyndon and so probably covered quite distinct ground from that traversed under her leadership. They however secured some examples of *Clitocybe hirneola* Fr., *Collybia atrata* Fr., *Inocybe eutheles* B. & Br., *Boletus castaneus* Bull., and *Hydnum nigrum* Fr. The two divisions reunited at the Fox and Pelican at Hindhead at 5 p.m. and the carriages were then re-entered for the return drive to Haslemere, during the course of which it was ascertained that the forward division had collected nice specimens of *Cortinarius (Inoloma) violaceus* (L.), *Clavaria argillacea* Pers., *Hydnum zonatum* Batsch, *Ulocolla foliacea* Bref. and *Otidea leporina* (Batsch) Fckl. In the evening the annual club dinner was held at the White Horse Hotel, and subsequently the President (Mr. R. H. Biffen, M.A.) at the headquarters delivered his Presidential Address entitled "Combating the Fungoid Diseases of Plants" (see p. 112), after which the Hon. Secretary brought to the notice of the members two recent additions to the British list, viz., *Polyporus benzoinus* Fr. and *Marasmius archyropus* Fr. var. *suaveolens* Rea., both of which are dealt with in the Fungi New to Britain (see p. 127). Mr. Rea also exhibited a specimen of *P. benzoinus* Fr. and of the somewhat rare *Choiromyces meandriformis* Vitt. which he had received from their member Mr. W. B. Allen from Benthall earlier in the season and he also handed round a drawing by Mrs. Rea of *Lactarius spinosulus* Quél, which from the books seemed as regards the type to have been hitherto unrecorded for Britain, and Mr. W. B. Allen, with the same end in view, brought a specimen in spirit for their examination. Mr. A. D. Cotton, F.L.S., exhibited some potatoes infested with *Œdomyces leproides* Trabut.

On Thursday, Sept. 28th, the morning was devoted to the examination of the material collected on the previous days and after the members had been photographed, a late start was made about 12.30, under the leadership of Mr. E. W. Swanton. They first proceeded up the High Street and took the right hand road, and after a short time traversed a pasture on the other side of which they entered a wood that had been very recently cut down and which was now overgrown with brambles. Mr. Woodcock, who had very kindly offered to conduct the members, next led them into a very swampy wood belonging to Mrs. Stewart Hodgson, where but very little of interest was to be found. The members next explored the wood on Grayswood Common, where on two separate occasions examples have been found of the rare Phalloid *Clathrus cancellatus* Tournef. A very careful and prolonged search was made here but the wood was too thick and overgrown, and although the members tried to detect the *Clathrus* by its vile odour nothing better than

Ithyphallus impudicus Fisch. and *Mutinus caninus* Fr. rewarded their endeavours with the exception that Mr. J. F. Rayner secured a nice tuft of *Clitocybe pergamena* Cke. The walk was then continued uphill and down dale till the members neared the confines of Dr. Jonathan Hutchinson's house, where they collected some examples of *Hygrophorus foetens* Phill. (it is questionable whether this be really distinct from Eccilia atropuncta Pers., which is said to have a very strong unpleasant smell when past perfection), *Geoglossum glabrum* Pers. and *Rhopographus Pteridis* (Sow.) Wint. Some of the members proceeded direct from Haslemere to Dr. Jonathan Hutchinson's house, where they were all hospitably entertained to tea. The return walk was taken across the fields and Miss Eyre boxed some specimens of *Leptonia solstitialis* Fr.

In the evening Dr. C. B. Plowright gave a popular lecture on "Mushrooms and Toadstools" to the members of the Haslemere and Hindhead Microscope and Natural History Society, which was much appreciated, and Mr. J. F. Rayner followed with a paper entitled "Mycology as a Branch of Nature Study" (see p. 123). Hearty votes of thanks were then accorded to the Haslemere and Hindhead Miscroscope and Natural History Society for the very kind way that they had received the Society; to Dr. Jonathan Hutchinson for placing his very interesting Educational Museum at their disposal for the exhibition of the fungi collected, the reading of papers and the transaction of the Society's business; to the various landowners and tenants for the kind permissions to go over their woods and lands; and to their fellow member, Mr. E. W. Swanton, for all the trouble and care that he had taken in making all the arrangements for the very successful week's foray at Haslemere. Monsieur Emile Boudier was then unanimously elected the first Honorary Member of the Society under Rule 4, which provides that gentlemen of pre-eminence in Mycology or who have rendered special service to the Society are alone eligible for this position. Both these qualifications Monsieur Boudier possessed and they were grateful to him for his assistance in the past. Subsequently the Hon. Secretary communicated this resolution to Monsieur Boudier, and in reply received the following gracious letter:—

"J'ai bien reçu hier la lettre par laquelle vous m'annonciez que la Société Mycologique d'Angleterre venait de m'accorder le titre de Membre honoraire. C'est un honneur auquel j'ai été d'autant plus sensible que je ne m'y attendais pas. Je viens donc vous prier, cher Monsieur, d'être mon interpréte auprès des membres de la Société pour les remercier de l'insigne honneur qu'ils me font en m'accordant ce titre réservé, je le sais, à des Mycologues qui ont bien mérité de la Science. J'ai toujours eu de trop bons rapports avec nos collègues, en Mycologie d'Angleterre que j'ai

pu apprecier, pour ne pas être fier de ce titre et je suis heureux de pouvoir me regarder comme un de leurs membres. Veuillez agréer, Monsieur le Secrétaire général et bien cher Collègue avec mes remerciments, l'assurance de mes meilleurs sentiments et veuillez me croire toujours, votre bien dévoué. Boudier, Montmorency, ce 30 Octobre, 1905."

On Friday, the 29th of September, the morning was spent in the determination of the specimens, and Mr. E. M. Holmes kindly brought to the headquarters a very interesting stag's horn form of *Polyporus squamosus* (Huds.) Fr. which was found in a London cellar. About 1 p.m. Mr. E. W. Swanton led the members off to Marley Heights. On Marley Common *Clavaria argillacea* Pers. was gathered and *Otidea aurantia* (Pers.) Mass. was remarkably abundant on the new road leading up to the top of the promontory. Upon ariving at the farm house the members were hospitably entertained to tea by Mr. Herbert Hutchinson and shortly afterwards the return walk was commenced to Haslemere. The most interesting specimens collected during the day included *Cortinarius (Phegmacium) triumphans* Fr., *cristallinus* Fr., *(Telamonia) armillatus* Fr., and *Craterellus crispus* Fr.

On Saturday, the 30th of September, Mr. D. Taylor brought in a fine example of *Clavaria formosa* Pers. and *Helvella lacunosa* Afz. which he had collected near Fernhurst. Four hundred and eighty-eight species were identified during the foray, and Miss A. Lorrain Smith, F.L.S., subsequently reported that she had found *Hypoderma Desmazieri* in Woolmer Forest, which is a recent addition made by her to the British list, and a full description of the same is set out on p. 128.

COMPLETE LIST OF FUNGI GATHERED DURING THE FORAY.

Amanita phalloides Fr., mappa (Batsch) Fr., muscaria (Linn) Fr., pantherina (DC.) Fr., rubescens Pers., spissa Fr.

Amanitopsis vaginata (Bull.) Roze, strangulata (Fr.) Mass.

Lepiota procera (Scop.) Fr., rachodes (Vitt.), Fr., gracilenta (Kromb.) Fr., cristata (A. & S.) Fr., amianthina (Scop.) Fr.

Armillaria mellea (Vahl.) Fr., mucida (Schrad.) Fr.

Tricholoma resplendens Fr., flavo-brunneum Fr., albobrunneum (Pers.), rutilans (Schaeff.), columbetta Fr., terreum (Schaeff), saponaceum Fr., sulphureum (Bull), carneum (Bull.), personatum Fr., nudum (Bull.), panaeolum Fr., grammopodium (Bull.).

Clitocybe nebularis (Batsch), hirneola Fr., odora (Bull.), rivulosa Pers., cerussata Fr., phyllophila Fr., pergamena Cke., infundibuliformis (Schaeff.), inversa (Scop.), flaccida (Sow.), cyathiformis Fr., metachroa Fr., ditopa Fr., fragrans (Sow.).

Laccaria laccata (Scop.), Berk, var. amethystina Bolt. var tortilis Bolt.

Collybia radicata (Rehl.), fusipes (Bull.), maculata (A. & S.), butyracea (Bull.), velutipes (Curt.), conigena (Pers.), tuberosa (Bull.), acervata Fr., dryophila (Bull.) extuberans (Batt.) Fr., atrata Fr.

Mycena pura Pers., luteo-alba (Bolton), lactea Pers., rugosa Fr., galericulata (Scop.), var. calopa Fr., polygramma (Bull.), alcalina Fr., metata Fr., sanguinolenta (A. & S.), galopa Fr., leucogala Cke., epipterygia (Scop.), clavicularis Fr., pelliculosa Fr., vulgaris Pers., tenerrima (Berk.), capillaris (Schum.).

Omphalia rustica Fr., fibula (Bull.), var. Swartzii Fr.

Pleurotus septicus Fr.

Pluteus cervinus (Schaeff.).

Entoloma lividum Fr., sinuatum Fr., porphyrophaeum Fr., jubatum Fr., sericellum Fr., rhodopolium Fr., sericeum (Bull.), nidorosum Fr.

Clitopilus prunulus (Scop.).

Leptonia lampropa Fr., solstitialis Fr.

Nolanea pascua (Pers.), pisciodora (Ces.).

Claudopus variabilis (Pers.).

Pholiota terrigena Fr., erebia Fr., togularis (Bull.), radicosa (Bull.), spectabilis Fr., mutabilis (Schaeff.), marginata (Batsch).

Inocybe pyriodora (Pers.), maritima Fr., rimosa (Bull.), asterospora Quél, eutheles (B. & Br.), geophylla (Sow.), petiginosa (Fr.) Quél.

Hebeloma fastibile Fr., versipelle Fr., mesophaeum Fr., crustuliniforme (Bull.), nauseosum Cke.

Flammula carbonaria Fr., flavida (Schaeff.), inopa Fr., sapinea Fr.

Naucoria escharoides Fr.

Galera tenera (Schaeff.), spartea Fr., hypnorum (Batsch).

Tubaria furfuracea (Pers.), crobula Fr.

Crepidotus mollis (Schaeff.).

Agaricus arvensis Schaeff. xanthodermus Gen., campestris Linn., comtulus Fr.

Stropharia aeruginosa (Curt.), inuncta Fr., stercoraria Fr., semiglobata (Batsch), squamosa Fr.

Hypholoma sublateritium (Schaeff.), epixanthum Fr., fasciculare (Huds.), dispersum Fr., lacrymabundum Fr., velutinum Pers., appendiculatum (Bull.), hydrophilum (Bull.).

Psilocybe subericaea Fr., uda (Pers.), semilanceata Fr., foenisecii (Pers.).

Psathyra corrugis (Pers.), fibrillosa (Pers.).

Anellaria separata (Linn.).

Panaeolus sphinctrinus Fr., campanulatus (Linn.), papilionaceus (Bull.).

Psathyrella gracilis Fr., disseminata (Pers.), atomata Fr.

Coprinus comatus Fr., atramentarius Fr., niveus Fr., micaceus (Bull.), lagopus Fr., domesticus Pers., plicatilis (Curt.).

Bolbitius fragilis Fr.

Cortinarius (Phlegmacium) triumphans Fr., largus Fr., multiformis Fr., purpurascens Fr., crystallinus Fr.

(Myxacium) collinitus Fr., var. mucosus Fr., elatior Fr.

(Inoloma) violaceus (Linn.), albo-violaceus (Pers.), bolaris (Pers.), pholideus Fr.

(Dermocybe) tabularis Fr., caninus Fr., anomalus Fr., lepidopus Cke., sanguineus Fr., cinnamomeus Fr., var. semisanguineus Fr., orellanus Fr.

(Telamonia) torvus Fr., armillatus Fr., hinnuleus Fr., brunneus (Pers.), hemitrichus Fr., paleaceus Fr.

(Hydrocybe) subferrugineus Fr., duracinus Fr., castaneus (Bull.), dolabratus Fr., rigens (Pers.), decipiens (Pers.), acutus (Pers.).

Gomphidius glutinosus (Schaeff.), roseus Fr., viscidus (Linn.), gracilis Berk.

Paxillus involutus (Batsch), panuoides Fr.

Hygrophorus cossus (Sow.), pratensis (Pers.), virgineus (Wulf.), niveus (Scop.), foetens Phill., laetus Fr., coccineus (Schaeff.), miniatus Fr., turundus Fr., puniceus Fr., conicus (Scop.), chlorophanus Fr., psittacinus (Schaeff.), unguinosus Fr.

Lactarius torminosus (Schaeff.), turpis (Weinm.), pubescens Fr., insulsus Fr., blennius Fr., pyrogalus (Bull.), chrysorrheus Fr., piperatus (Scop.), vellereus Fr., deliciosus (Linn), quietus Fr., theiogalus (Bull.), vietus Fr., rufus Scop., glyciosmus Fr., serifluus (DC.), mitissimus Fr., subdulcis (Bull.).

Russula nigricans (Bull.) Fr., adusta Pers., densifolia Secr., chloroides (Krombh) Bres., furcata Pers., drimeia Cke., lactea Fr., var. incarnata Quél., virescens (Schaeff.), lepida Fr., xerampelina Fr., vesca Fr., cyanoxantha (Schaeff.), heterophylla Fr., foetens Pers., fellea Fr., emetica Fr., ochroleuca Fr., fragilis Pers., var. violacea Quél.

Cantharellus cibarius Fr., aurantiacus Fr., tubaeformis Fr., infundibuliformis Fr.

Nyctalis asterophora Fr., parasitica (Bull.).

Marasmius peronatus (Bolt.), oreades (Bolt.), erythropus Fr., ramealis (Bull.), rotula (Scop.), androsaceus (Linn.), epiphyllus Fr.

Lentinus cochleatus Fr.

Panus stipticus (Bull.).

Lenzites betulina (Linn.).

Boletus luteus Linn., elegans (Schum.), flavus With., chrysenteron Fr., subtomentosus Linn., radicans Pers., pruinatus Fr., variegatus Swartz., badius Linn., piperatus Bull., bovinus Linn., granulatus Linn., edulis Bull., luridus Schaeff., laricinus Berk., scaber Fr., versipellis Fr., castaneus Pers.

Fistulina hepatica Fr.

Polyporus Schweinitzii Fr., rufescens Fr., squamosus (Huds.) Fr., intybaceus Fr., sulphureus Fr., betulinus (Bull.) Fr., adustus Fr., amorphus Fr., lacteus Fr., fragilis Fr.

Polystictus versicolor (Huds.), radiatus (Sow.), abietinus Fr.

Fomes igniarius (Huds.), annosus Fr., ferruginosus (Fr.) Mass.

Poria vaporaria Fr.

Daedalea quercina (Linn.).

Merulius lacrymans Fr.

Hydnum imbricatum Linn., repandum Linn., zonatum Batsch., nigrum Fr., auriscalpium Linn., niveum Pers., farinaceum Pers.

Irpex obliquus (Schrad.).
Phlebia merismoides Fr., radiata Fr.
Grandinia granulosa Fr.
Craterellus cornucopioides Pers., crispus Fr.
Stereum hirsutum Fr., purpureum Pers., rugosum Fr., spadiceum Fr.
Corticium calceum Fr., laeve Pers., nudum Fr., comedens Fr.
Hymenochaete rubiginosa Lév.
Peniophora quercina (Fr.) Cke., incarnata (Fr.) Cke.
Thelephora anthocephala Fr., laciniata Pers.
Coniophora puteana (Fr.) Mass.
Soppittiella sebacea (Berk.) Mass.
Sparassis crispa (Wulf.) Fr., laminosa Fr.
Clavaria muscoides Linn., cinerea Bull., cristata Holmsk., rugosa Bull., formosa Pers., abietina Schum., fusiformis Sow., dissipabilis Britz., inaequalis Fl. Dan., argillacea Pers., vermicularis Scop., fragilis Holmsk., tenuipes B. & Br.
Typhula erythropus Fr.
Pistillaria quisquiliaris Fr.
Auricularia mesenterica Fr.
Exidia albida (Huds.) Bref.
Ulocolla foliacea (Pers.) Bref.
Tremella mesenterica Retz., intumescens Eng. Bot.
Dacryomyces deliquescens Duby.
Calocera viscosa Fr., stricta Fr.
Cyathus striatus Hoffm.
Crucibulum vulgare Tul.
Sphaerobolus stellatus Tode.
Lycoperdon excipuliforme Scop., gemmatum Batsch., pyriforme Schaeff., perlatum Pers., umbrinum Pers., depressum Bon., bovista Linn.
Bovista plumbea Pers.
Scleroderma vulgare Fr., verrucosum Pers.
Rhizopogon luteolus Tul.
Ithyphallus impudicus (Linn.)
Mutinus caninus (Huds.) Fisch.
Puccinia poarum Niel.
Phragmidium rubi (Pers.).
Uredo mulleri Schröt, *Woolmer*.
Sphacelotheca hydropiperis (Schum.).
Claviceps microcephala (Wallr.), Wint.
Cordyceps militaris (Linn.), ophioglossoides (Ehr.), capitata (Holmsk).
Hypocrea rufa (Pers.).
Nectria cinnabarina (Tode) Fr.
Hypomyces rosellus (A. & S.) Tul. *Woolmer*, torminosus (Mont.) Tul.

Xylaria hypoxylon (Linn.).
Ustulina vulgaris Tul.
Daldinia concentrica (Bolt.).
Hypoxylon coccineum Bull., fuscum (Pers.) Fr.
Rhytisma acerinum (Pers.).
Rhopographus Pteridis (Sow.) Wint.
Diatrype stigma Fr.
Chaetomium elatum Kunze. *Inval.*
Melanomma pulvis-pyrius (Pers.) Fckl.
Podospora minuta Wint. *Woolmer.*
Sporormia minima Auersw. *Woolmer.*
Leptosphaeria doliolum Ces & De Not.
Elaphomyces granulatus Vitt., variegatus Fr.
Hypoderma virgultorum D.C., Desmazieri Duby. *Woolmer.* New to Britain.
Dichaena quercina (Pers.) Fr.
Helvella lacunosa Afz.
Geoglossum glabrum Pers.
Leotia lubrica Pers., acicularis Pers.
Peziza vesiculosa Bull., badia Pers., succosa Berk.
Otidea leporina (Batsch) Fckl., aurantia (Pers.) Mass. luteo-nitens (B. & Br.) Mass.
Plicariella trachycarpa Rehm. (= Curreyella trachycarpa Mass.*)
Humaria humosa (Fr.) Sacc., granulata (Bull.) Sacc.
Lachnea hemispherica Gillet.
Dasyscypha virginea (Batsch.) Fckl., ciliaris (Schrad.) Sacc. *Woolmer.*, calycina (Schum.) Fckl.
Tapesia aurelia Phil.
Chlorosplenium aeruginosum De Not.
Ciboria ochroleuca (Bolt.) Mass., echinophila (Bull.) Sacc.
Helotium citrinum Fr., virgultorum (Vahl.) Karst., var. fructi-genum (Bull.) Rehm., cyathoideum (Bull.) Karst. *Inval.*, fagineum (Pers.) Fr.
Mollisia cinerea (Batsch) Karst.
Ascophanus carneus Boud. var. testaceus Mass.
Ascobolus aerugineus Fr., furfuraceus Pers., immersus Pers.
Saccobolus neglectus Boud.
Coryne sarcoides Tul.
Bulgaria polymorpha (Œder) Wetts.
Cenangium abietis (Pers.) Rehm. *Woolmer.*
Scleroderris livida (B. & Br.) Mass.
Spinellus fusiger (Cke.) Van Teigh.
Sporodinia grandis Link.
Syzygites megalocarpus Ehrb.
Sphaeropsis pinastri (Lév.) Sacc.

*Curreyella is a Pyrenomycete A.L.S.

Sphaeronemella fimicola March. *Woolmer.*
Dinemasporium graminum Lév.
Penicillium glaucum Link.
Rhinotrichum Thwaitesii B. & Br.
Botrytis cinerea Pers.
Trichothecium roseum Link.
Tubercularia vulgaris Tode.
Fusarium roseum Link.
Ptychogaster albus Cda.

*Mycetozoa.**

Physarum nutans Pers.
virescens Ditmar and var. nitens Lister, developed from plasmodium. This is *the first British specimen* we have recorded *of the var. nitens*, all our other specimens are from N. America, except one from Bohemia.
Fuligo septica Gmel., ochracea Peck., developed from plasmodium. This is *the third British record.*
Craterium pedunculatum Trent., leucocephalum Ditmar.
Leocarpus vernicosus Link.
Chondrioderma Michelii Rost.
Didymium effusum Link., nigripes Fr., Clavus Rost., on straw *Marley Heights*, farinaceum Schrad.
Spumaria alba DC.
Stemonitis fusca Roth., ferruginea Ehr.
Comatricha obtusata Pers., typhoides Rost.
Amaurochaete atra Rost.
Cribraria aurantiaca Schrad., argillacea Pers.
Licea flexuosa Pers.
Enteridium olivaceum Ehr., var. licioides Lister.
Tubulina fragiformis Pers.
Trichia fallax Pers., persimilis Karst.
Arcyria albida Pers., punicea Pers., incarnata Pers.
Lycogala miniatum Pers.

* This list with accompanying notes was kindly furnished by Miss Gulielma Lister, F.L.S., and Mr. Arthur Lister, F.R.S.

COMBATING THE FUNGOID DISEASES OF PLANTS.

By R. H. Biffen, M.A.

PRESIDENTIAL ADDRESS.

Ladies and Gentlemen,—

The subject I have chosen to address you upon this evening is the somewhat technical one of the methods at our disposal for protecting our cultivated plants from the attacks of parasitic fungi. I have chosen this branch of mycology in the first case because it is one with which I have a certain amount of practical experience and also because I think that if an economic side is given to our work it is likely to prove of more general interest than if we confine ourselves solely to the finding and describing of rare or new species. My work as a botanist concerned for the most part with our cultivated crops continually brings me into contact with the problems of plant diseases, and I have gradually become convinced that it is one of the duties of the mycologist to obtain, as far as possible, a knowledge of the life stories of the commoner parasites and methods of checking their spread for the benefit of those who would save their crops from their devastating influence.

It has I know been objected that we have no right to attempt to upset the balance of nature by limiting the spread of these parasites, but the objection loses weight when one recognises that the crops we attempt to save cannot be looked upon as natural in the same sense as the wild plants of our flora. They are grown under conditions which do not occur in nature, and left without man's fostering care they would soon be extinct. Under such circumstances the risk of upsetting a very problematical balance is one which does not appeal much to the cultivator.

The subject is essentially a modern one. Though the existence of disease in plants was known from the earliest times the facts of parasitism were so imperfectly understood that satisfactory attempts to prevent epidemic outbreaks of any fungus were practically impossible. With an increase of our knowledge of the relationship of host and parasite the possibilities of the subject have become evident, and now, when we come to consider the shortness of the period involved, it must be admitted that we have at our disposal a fair assortment of methods for com-

bating the spread of disease. All cases cannot be satisfactorily dealt with, but in the majority the evil can at least be mitigated to some extent.

The economic importance of these plant diseases depends on the intensity of the attack and the value of the host plant. A cereal crop for instance may be but slightly attacked by one of its rust parasites and comparatively little damage may result, whilst a serious attack may not only mean a greatly diminished yield but also a serious depreciation in the value of the grain.

In the same way *Phytophthora infestans* may in some seasons be practically harmless, whilst in others, as in 1845, its attack may be so virulent that the potato crop is completely destroyed throughout the country. Obviously such external conditions are beyond our control, nevertheless much can be done to minimize the losses these fungoid parasites cause.

When we attempt to obtain some idea of the actual magnitude of such losses we can only find the most fragmentary data, yet they are quite sufficient to show us the importance of the issues at stake. A few well-worn statistics may be quoted here. According to the report issued by the International Phytological Commission in 1893 the cereal rusts alone cost Prussia over £20,900,000; in other words, one-third of the total crop of the country was destroyed. These same rusts cost Australia £2,500,000 in 1890-1. In the following year, 1892, a vine disease was responsible for the loss of a similar amount in California. When one adds to these figures the unrecorded losses due to potato disease, to smuts in cereals, to decay in fruits, in timber and so on, one begins to realize that the year's bill must be an enormous one. Yet one often hears the farmer or horticulturalist say that such and such a disease is of no practical importance. It would be better with them if this were really the case, but those who have the opportunity of watching their crops are driven to recognise that the small and generally unrecognised losses in their cumulative results are as serious as those for which statistics are obtainable.

In countries where the importance of the proper care of farm and garden crops is recognised such knowledge has led to State supervision of the cultivation of certain crops and regulations are issued for combating the parasites which attack them, penalties being imposed for the non-fulfilment of the precautions demanded. How far State interference is practicable in this country is an open question, though of its value in some cases there can be no doubt. Without discussing the possibilities of checking the importation and wholesale dissemination of new parasitic forms from abroad, which as a matter of fact is prevented in the case of farm animals, let us turn to the efforts actually made in this country to minimize the losses due to the

attacks caused by parasitic fungi. Unfortunately there is little to record. We find that our Board of Agriculture publishes and distributes from time to time brief pamphlets dealing with some of the more important diseases, while various local experimental stations carry out similar work for their own particular districts. What little research work on the life histories of these parasites and the most practicable methods of keeping them within reasonable bounds is carried out in this country we owe to scientists whose time as a rule is already occupied with educational matters. One can but hope that the future will bring some recognition of the nation's losses year by year caused by epidemics which are frequently preventable and that this may lead to the setting aside of a sum of money, small in proportion to these annual losses, for the further study of this subject. Of the true economy of such a course there can I believe be no doubt.

The methods at our disposal for combating plant diseases may be grouped under three headings:—

(1) Avoiding the conditions known to be favourable for the spreading of the disease.
(2) Destruction of plant tissues containing the resting forms of the fungus.
(3) Exterminating the parasite without injuring the host plant.

(1) In many cases we have to admit that it is impossible to avoid the conditions which we know are favourable for infection and the matter is complicated by the fact that these conditions are not the same for all fungi. For instance the atmospheric conditions which determine whether *Phytophthora infestans* shall become epidemic or not are altogether beyond our control. Nevertheless we can frequently choose situations for planting in which unfavourable conditions are not likely to occur. A classical example of this is afforded by the history of the epidemics of larch disease *Dasyscypha calycina (Schum.) Fuckl.* = *(Wilkommii)* Hartig—a fungus we have already found during our excursions. This parasite, although occurring on larches in their Alpine home does little damage to them there. But when larches were extensively planted in the lowlands, in spite of the fact that judging from their vigorous growth all conditions were favourable for their culture, the fungus made rapid headway and became at once a pest to be seriously reckoned with. The explanation was given by Hartig. In the Alps the larch sheds its foliage and remains dormant until May, when the buds open rapidly and the foliage matures in the course of a week or two. In the lowlands, on the other hand, the buds begin to open far earlier—often in March—and exposed as they

are to spring frosts, to cold winds, etc., the foliage does not develop fully for some six or eight weeks. The result of this tardy development is that the immature foliage is exposed for a lengthy period to the attacks of certain insects such as the larch aphis *(Chermes laricis)*. As the fungus can only find its way into the larch through wounds in its tissues one can readily understand that the trees growing in the lowlands are far more liable to its attacks than those of the highlands where the foliage is only in a sufficiently succulent condition to tempt the aphis for a brief period.

A second example is provided by *Pythium de Baryanum* the fungus responsible for the "damping off" of seedlings. This parasite is capable of attacking many kinds of seedlings and rapidly reducing them to a slimy mass. It is particularly common on the seedlings of Cruciferous plants, the favourite host being perhaps the common cress. If seed beds of this plant be thickly sown and kept thoroughly moist one can generally count on an outbreak of the disease. By simply altering the external conditions by growing the seedlings in a dry atmosphere the ravages of this fungus can readily be kept under control. This same factor, excessive moistness of the atmosphere is responsible for the rapid spreading of many of the diseases which attack plants cultivated under glass. Many a crop of cucumbers for instance has been utterly destroyed by gardeners failing to realize that a thoroughly moist, warm atmosphere is far more favourable to the growth of *Botrytis cinerea* than that of the crop they intend to grow.

Under this same heading of avoiding conditions known to be favourable for the spread of fungoid diseases we may include the subject of the proper treatment of wounds in plant tissues. A considerable number of fungi can only bring about the infection of their host plants through abrasions in the cuticle or the corky protective layers. As long as these tissues are sound the plant remains altogether free from the attacks of such wound-parasites. A broken branch, bruises caused by hail-stones or by the rubbing of animals, etc., the wounds caused by pruning, by careless fruit-picking and so on, may all serve as points of entry for a fungus. Such wounds, if small, are readily healed by the formation of callus, but where large snags are left by breakages or by bad pruning, the healing process may take several years to complete, and meanwhile the exposed surface is liable to become infected by various wood-destroying parasites. Any exposed surfaces should therefore be treated in such a way as to reduce this chance to a minimum. The best method is to pare the exposed surface until it is smooth, dress it with a dilute solution of corrosive sublimate, and when this has thoroughly dried in to cover the wound with hot tar.

Where possible this operation should be carried out in the autumn, and as the dressing is liable to crack it should be examined from time to time and renewed if necessary. The smaller wounds produced by pruning cannot be treated in this way owing to the necessity of pruning back to a bud which would be killed by such treatment. These small wounds frequently form the favourite place of entry for *Nectria ditissima.* Fortunately it is now becoming recognized that the wholesale and indiscriminate pruning to which our fruit trees are generally exposed is unnecessary. This fact will tend to keep down to a considerable extent the dreaded canker fungus. The one other method we can consider now of avoiding conditions which are likely to bring about infection is the one employed in combating the spread of some of the heteroecious rusts. For such fungi an alternative host plant is essential for their complete development, certain spore forms being produced on one host plant A which then infect the second host plant B. Their life cycle is only complete when the host A is again infected through the spores produced on B. By breaking the life-cycle one can obviously check the extended spread of such parasites. If A is to be cultivated, then it is only necessary to keep down the alternate host plant in the immediate vicinity. Numerous examples of the practical application of this principle might be quoted. Garden peas, for instance, are attacked by a rust *(Uromyces pisi)* which forms an aecidial stage on spurges. The spores produced on this host pass in turn to the cultivated garden peas, reproducing the well known disease. A second example is provided by *Gymnosporangium Sabinae.* This rust is common on pears, the aecidial stage being formed in abundance on the foliage and fruits. The crop produced on infected trees is light and as a rule unsaleable. The teleutospore stage occurs on the Common Savin, where it forms characteristic jelly-like masses. If these hosts in the immediate neighbourhood of the pears are destroyed then, as the fungus cannot complete its life cycle, the epidemic ceases. To secure satisfactory results by destroying the alternative host plant it is essential that the whole neighbourhood should be cleared. As this generally demands a certain amount of cooperation it cannot always be relied upon to give altogether satisfactory results.

Setting aside as an obvious predisposing cause the using of soil for potting purposes which has already carried a diseased crop we may turn to a consideration of the best methods of disposing of tissues known to be diseased. The ideal method of course is to burn all such plant remains. In practice, however, this is by no means as simple as it would appear to be at first sight. One cannot for instance readily burn all the diseased haulm of a crop of potatoes, neither can a farmer afford

to waste in such a fashion all the diseased tubers, however desirable the process may be from the theoretical standpoint. In practice the diseased haulm is as a rule thrown up in heaps to form manure. Under the conditions obtaining in these heated heaps the spores appear to be—for the most part at all events—destroyed. Nevertheless care must be exercised even here, for it is an indisputable fact that the spores of many of the smut family will actually germinate under such conditions, giving rise to fresh spore-forms capable of bringing about further infection. If the smutted material must be disposed of by this means then the heaps should be allowed to lie as long as possible. The advantage of this is well shown in a series of experiments carried out by Wollny in Munich. He shook up grains of maize—a crop not grown in that neighbourhood—with the spores of a smut which attacks it, and then sowed them in plots previously dressed with fresh or with old manure. Control plots received no dressing. These latter produced no diseased plants, those with the old manure a few, and those with the fresh manure a very considerable percentage. The fresh manure had provided the fungus spores with a medium well suited for their development. In other cases the diseased crop has to be disposed of as food for stock, *e.g.*, potatoes infected with *Phytophthora* or swedes with the "finger and toe fungus" *Plasmodiophora brassicae.* The plant remains then again find their way back to the soil. The assumption underlying this procedure is that the fungus spores are killed during their passage through the animal's digestive system. In the majority of cases this is undoubtedly true, but the fact should not be lost sight of that it has been conclusively proved that a preliminary digestion is actually necessary for the germination of the spores of some fungi. At present though we know of no such case amongst the common plant parasites, but this of course is no guarantee that such cases do not occur. At first sight the undoubted spreading of "finger and toe" might appear to be an example of a fungus whose spores germinate readily after their passage through an animal's body. More careful investigation shows that this is not really the case, for in feeding the diseased tissues to stock fragments are sure to find their way into the litter and thence on to the land, where, given a suitable host plant, they soon reproduce the disease. The most rational way of disposing of such a crop is to feed it to stock on grass-land where, as there are no *Cruciferæ* present, there is no possibility of the fungus spores coming into contact with the root system of a suitable host.

We now come to what is perhaps the most practical side of our subject—the methods at our disposal for destroying parasites without injuring the host plant. The means depend upon

the life history of the fungus. Starting with such fungi as the smuts which attack the cereals in the seedling stage we know that the infection is brought about by spores which adhere to the seed coats and consequently are sown with the grain. If one could in any way destroy these lurking spores then the crop would be free from infection. Many methods have been suggested for this purpose and some have actually been employed for centuries. One of the oldest of these is to soak the grain in strong brine a short time previous to sowing. This process kills many of the spores without damaging to any extent the germinating capacity of the grain. In later times this process has been modified by employing steeps of copper sulphate in place of the brine. Still more recently the employment of formalin or of lysol has been recommended. These various steeps have proved very satisfactory for the prevention of the cereal smuts, but they bid fair to be replaced by Jensen's hot water method. The biologic fact upon which this process is based is that the smut spores are killed on being exposed to a temperature of 132 F., which however is not injurious to the grain. In practice a quantity of about a bushel is placed in some readily permeable receptacle and then dipped in a vessel of water at a temperature of 120 F. The grain is then thoroughly stirred up so that every part of the bulk is exposed to its heating action. After this preliminary warming the vessel is transferred to water at a temperature of 132 F., and by alternately lowering, raising and twisting, the whole mass of grain is heated to a temperature within a degree or two of this limit. Should the temperature fall during the ten minutes this process continues it should be brought back to its proper level by adding more hot water. The one essential point to notice is that the temperature should be kept as near to 132 F. as possible. A slightly higher temperature may result in killing the grain. The superiority of this process is no doubt due to the fact that one can readily raise the whole bulk of the grain to the desired temperature, though it is difficult to make certain that every portion is wetted in the steeping process. Smut spores in the groove of a grain of wheat or in the brush of hairs at its apex might well escape the action of a copper sulphate steep owing to the difficulty of expelling the air bubbles forming in these positions.

In spite of the simplicity of the methods described smut still flourishes in the cereals and one can never hope to see it thoroughly eradicated until the seedfirms take the matter in hand and guarantee their seed free from lurking spores. The additional cost to the buyer would be so insignificant that the idea might well be put into practice at once. The various methods of attacking lurking spores will in the near future find

an extended application, for it is indisputable that the spores of many of our fruit tree pests such as *Monilia*, various *Erisyphe*, etc., rest during the winter in the crevices of the bark, or even between the bud scales and in lichens on the trunks, where they might readily be disposed of by the thorough application of fungicides. Under such circumstances there need be no hesitation in employing solutions which in the case of an actively growing tree might do more harm than good. We no longer have to consider, for instance, the scalding effect of some of the commoner reagents employed on the foliage. Thus the bark of a resting tree may safely be sprayed heavily with a ten per cent. solution of ferrous sulphate without experiencing any ill effects. If on the other hand this solution was applied to a tree in full activity the foliage would be destroyed.

Many of our worst plagues cannot unfortunately be attacked in so simple a fashion, and methods have to be resorted to for exterminating the parasite or its reproductive spores whilst it is in active growth on the host plant itself. For this purpose various fungicides are employed either in a liquid or a solid state. In such cases as the diseases brought about by the mildews *Erisyphe*, *Sphaerotheca*, *Phyllactinia*, etc., where practically the whole of the mycelium is on the surface of the host plant, the direct destruction of the fungus is an easy matter. For this purpose flowers of sulphur, either alone or mixed with two parts of fresh lime, may be dusted over the diseased portions of the plants, special brushes or bellows being made for the process. The dressing is an effective one, but its mode of action is not yet understood; it may be merely mechanical or it may be that toxic substances are produced in minute traces which kill the mycelium outright. Among the parasites which may be destroyed in this way are the grape mildew *Uncinula spiralis*, the rose and peach mildew *Sphaerotheca pannosa*, the hop mildew *S. castagnei* and so on.

Where deep seated mycelia like those of the rusts or of the Peronosporeæ and various Ascomycetes have to be dealt with liquid fungicides may be employed more satisfactorily. In such cases attention has to be directed to the crops of spores the mycelium produces rather than to the direct destruction of the mycelium itself. From time to time numerous fungicides have been recommended. For the most part they are preparations of copper or iron salts, less frequently permanganate of potash, sulphide of potassium or lysol are employed. None of these bid fair to surpass in general usefulness the original preparation of copper sulphate and lime known as "Bordeaux mixture." This was discovered accidentally, and we have to thank Millardet for the instantaneous recognition of the possibilities it opened up. He applied it first of all to vines, and finding it

satisfactory for checking the ravages of mildew applied it to the potato crop, where it was found to keep the Phytophthora under. Since his preliminary experiments its use has spread almost indefinitely, and many modifications of the original formula for preparing it have been suggested. If I may judge from the number of unsatisfactory cases where Bordeaux mixture has been used it appears to me that its proper method of preparation is still far from generally understood—a view borne out by the incorrect formulæ so often given in our horticultural papers. The most satisfactory mixture for most purposes is that containing 6lbs. of copper sulphate and 4lbs. of lime in 50 gallons of water. To secure the best results with this several precautions must be observed. In the first case the lime must be freshly slaked; a small quantity of water should then be added to it and the lime should be allowed to crumble down to a powder. When in this condition a little more water is to be added and well stirred in so that a thick cream free from any lumps is formed. After adding a quart or so of water and again well stirring the liquid may be diluted down to 25 gallons and then mixed with the copper sulphate previously dissolved in another 25 gallons of water. Whilst mixing the two solutions should be thoroughly stirred together. If prepared in this way a bluish precipitate of a curious starchy nature is formed which settles down very slowly. A mixture giving a granular precipitate which settles rapidly may be considered to be useless. Many of the recipes include such substances as treacle or soft soap, the object of these additions being to make the mixture adhere to the foliage better. Their employment is but an admission that the mixture is not properly prepared, for it will adhere perfectly if this starch-like precipitate is formed. Numerous effective forms of spraying machines for applying the mixture can now be obtained. The one point to which attention should be directed in spraying is the fineness of the spray. The more mist-like it is the better the plants can be coated with the fungicide.

Bordeaux mixture is now employed in combating the majority of the commoner plant diseases. Thus it is used on the large scale for the potato disease, hop and vine mildews, various fruit diseases such as scab in apples and pears and so on. One peculiarity in its effects may be noted here, that is that in certain cases the employment of Bordeaux mixture results in the sprayed plants retaining their foliage for a longer period than they would normally. This is more particularly the case with the potato. In consequence of this the plant has a longer assimilating period and the crop is proportionately increased. This increase is as a rule more than sufficient to repay the cost of spraying, a fact which should prove a powerful argument for

further extending the application of measures for checking the spread of potato disease.

In very few cases does it appear to be possible to entirely exterminate the deep seated mycelium of a parasitic fungus by merely cutting out the diseased areas of the host plant. Where as is the case with certain *Exoasci* the perennial mycelium grows forward with the host plant, pruning back beyond the point of infection frequently gives satisfactory results. The same, though to a lesser extent, is true of the apple canker *Nectria ditissima*. If, however, one attempts to get rid of the mycelium of such a fungus as *Polyporus hispidus* growing in the trunk of an apple tree by excising the diseased area one rarely succeeds. In such cases the attacks are not noticed until the fungus has penetrated throughout the tree trunk, when it begins to form its sporophores. Should these be removed the mycelium soon gives rise to a fresh crop.

Setting aside for the time prophylactic treatment—in itself always more or less troublesome and often costly—we may turn to consider fresh aspects of the problem of treating plant diseases. The hope of many is that the near future may bring us races of plants not susceptible to the particular diseases they now suffer from. Evidence for the possibility of this is gradually accumulating. We know for instance that if a large number of the varieties of any plant are cultivated under the same conditions so that all are freely exposed to the same chances of infection that the incidence of the disease is not the same in all cases. Some varieties are found to be especially susceptible to it, whilst others remain more or less free from disease. A repetition of the experiment season by season gives the same result, so that we may divide the varieties up into susceptible and immune forms, between the extremes on either side, many intermediates being met with.

Other things being equal the varieties least susceptible to disease should be cultivated. Unfortunately there are many points to be considered in choosing varieties for general use and we cannot guarantee that the disease-resisting type shall be satisfactory in all respects. This is the case for instance with the potato known as Evergood. Its introduction would have solved the problem of preventing potato disease to a great extent had it not been for the fact that combined with its undoubted disease resistance were bad eating qualities. The question which then arises is whether it is possible to do away with these bad qualities and still retain the power of resisting the attacks of fungi. That this is within the scope of the plant breeder is I think possible, though many difficulties are still to be surmounted. Granting the possibilities of this the difficulty has to be faced that the parasite may gradually adapt itself to

the new conditions provided by the immune varieties and so break down their mode of defence. Many say that the old varieties of the potato are far more susceptible to the attacks of *Phytophthora* than the newer ones, the impression being general that varieties wear out. I have tried in vain to satisfy myself that this is the case and I am beginning to question whether it is true. Certainly many of the newer varieties of this plant are as susceptible as the older ones, a fact which though not conclusive in itself does not fit well with the conception that the new form is necessarily superior in disease resistance to the older. Be this as it may the attempt to raise immune types of our commoner crops is one which is well worth the making.

NOTE ON SPHAEROPSIS PINASTRI SACC.

By Annie Lorrain Smith, F.L.S.

Sphaeropsis Pinastri Sacc.

A fungus on pine leaves which was described by Léveillé in Ann. Sci. Nat. 1846, p. 282, as *Phoma Pinastri* has since been placed by Saccardo (Syll. III, p. 300) in the genus *Sphaeropsis* on account of the brown simple spores. Léveillé in his original description says: "Les spores sont grosses, ovales, allongées, opaques, sans cloisons avec l'apparence d'une sporidiole globuleuse à leur interieur." Saccardo incorporates this description but adds the size of the spores as $10 \times 6\text{-}7\mu$, which indicates rather a small spore for this genus.

Another species, *S. Ellisii* Sacc, recorded from America on corticated branches of *Pinus silvestris* has also large spores measuring $30 \times 12\mu$ or $35\text{-}40 \times 15\mu$, which correspond evidently with the "spores grosses ovales" of Léveillé's *Phoma pinastri*. In the recently published volume of Rabenhorst's Fungi Imperfecti, Allescher has included both species under *S. Ellisii* with a var. *Abietis*, which grows on the cone scales of *Abies pectinata*. He gives the same spore measurements as for the American species. During the fungus foray at Haslemere a specimen was collected in Woolmer Forest on pine needles, the spores of which are large, oval and brown, and measure up to $40 \times 15\mu$. It corresponds with *Phoma pinastri* as understood by Léveillé and the name *Sphaeropsis pinastri* should have been retained rather than *S. Ellisii*. The epidermis of the leaf was split by the fungus. Léveillé says of his species that the epidermis was torn in a star-shaped manner, but that difference is certainly not specific.

Sphaeropsis pinastri (Lév.) has been already recorded as a British species growing on leaves and cones of *Pinus sylvestris* at Eastbourne.

MYCOLOGY AS A BRANCH OF NATURE-STUDY.

By John Frederick Rayner.

By way of preface to a plea for Mycology as a branch of Nature-study, it may be well to say a word about Nature-study itself. The rush to the towns, that portentous phenomenon of these latter days, has had far-reaching consequences, mostly bad. I do not forget that civilization, as the very word implies, came from town life, but civilization, like other things, may be bought at too high a price. Many observers are becoming alarmed about it. So lately as 1850 at least half of our population were engaged in agricultural pursuits, but now—we have it on the authority of one who cannot at any rate be called an alarmist, the Duke of Devonshire—77 per cent. labour, or do not labour, in the towns. Small wonder if so immense a transmigration should call forth the warnings of our modern Cassandras. It is the subject of anxious discussion at Church Congresses, at May Meetings, at Medical Association gatherings, in Parliament itself. It is declared to be laden with all manner of evils, physical, mental, moral and economic. The doctors tell us we are degenerating for want of pure air, our boasted sanitary improvements to the contrary notwithstanding. They say that one out of every five is tuberculous, that our jaws and our lungs are shrinking, our hair and teeth leaving us, our nerves shattered, the percentage of suicides increasing year by year; and as for lunacy, a problem of the near future will be the housing of the mentally afflicted. Some point to the declining birth-rate as a sign of national decay; others remind us that in spite of successive lowerings of the recruiting standard, sixty per cent. of candidates for military service have to be rejected as physically unfit. Our spiritual guides lament the frivolity of the age, the craving for change and excitement, the sensational and scrappy press, the garish and crowded public-house, the monstrous "gates" for professional football. Our politicians are aghast at the decay of agriculture, the lack of labourers, the inertia and want of enterprise on the part of those who still remain on the land, while the problem of the urban unemployed impels to novel and revolutionary legislation. But the Unemployed Act is fortunately only one of many signs of counteraction: witness the Garden City movement, the fashion

of holidays under canvas, the agricultural colonies of the Salvation and Church Armies, the enormous vogue of Pastor Wagner's "Simple Life," the great multiplication of books and periodicals dealing with gardening, botanical and rural topics, and last, but not least, the adoption of Nature-study in our schools. Now some of these evils may be exaggerated, some of the remedies futile, but we may claim this for Nature-study, that it gives at least a hint to the rising generation that there are other objects of interest in the world besides those which towns afford. It stimulates a love for the things of the country without which it were vain to hope that our people will be persuaded to retrace their steps countrywards. But I waste time in preaching to the converted. Nature-study has come to stay, and you and I are glad. My business this evening is to impress upon schoolmasters and all concerned the claims of our own pet subject, Mycology to wit.

Nature-study as frequently, I might perhaps say generally taught, resolves itself into Botany, by reason chiefly of the greater accessibility of material than either Zoology or Geology can offer; and the botany of our schools and Nature-study classes is mostly restricted to the flowering plants, often indeed only to the more conspicuous of these—the grasses, sedges and rushes being frequently neglected, a neglect of which indeed not a few among older botanists are found guilty. Now I wish to show cause why these boundaries should be enlarged. I do not mean to infer that all possible work within these boundaries has been or is being done, but at any rate the study of the flowering plants is limited by the season, and that season is succeeded by the season of Cryptogams. On the arrival of the "glorious First" the Phanerogams can offer little that is fresh to the wandering gaze of the youthful botanist, unless it be materials for the study of seed-dispersal or specimens for the examination of abscission-layers—but now come troops of new and strange forms of plant-life. I put aside for the present the Mosses, the Lichens and the Algae. Their structure and life-history have indeed attractions of their own, but call for the regular use of the compound microscope, and are hardly, to my thinking, so well fitted to engage the attention of the young naturalist as are the larger Fungi. Besides the "infinite variety" in form and colour of the Fungi, besides the large size, the fleshy substance, and the exceeding beauty of very many of them: besides the suddenness of their appearance and the rapidity of their growth, there is their strange and mysterious character. The student learns that there are plants without leaves, roots or flowers, plants devoid of that distinctive characteristic of plant-life, chlorophyll—a group unique on that account. He finds himself dealing with structures whose cell-formation proves their kin-

ship with his familiar friends the flowering plants, and yet which feed, as he himself feeds, on matter previously organised. Such a revelation, which all who have acquired the first elements of biology may receive, cannot but enlarge his conceptions of the vast hierarchy of Nature. But short of this, the youngest, the most thoughtless, will find something pleasurable in noting the obvious external features of Fungi: the plan of their multifarious forms, the meaning of their different parts, and the system of their classification. When one hears, as is not infrequently the case, some naïve expression of astonishment that these queer fragile objects which spring up at our feet for no other purpose it would seem than to offer a mark for a slashing walking-stick, have each and all of them a name and a place in the universe as definite if not as important as that of the heedless destroyer, one begins to recognise that Mycology has in it something of almost ethical import.

Then there is their edibility. From ethics to gastronomics is somewhat of a descent perhaps, but the appeal of the palate is not to be altogether disregarded, and may even bear its own particular lesson: new foods may lead to a reconsideration of the whole question of foods and feeding, which some say we English stand in great need of. Be that as it may, people are quite ready to listen when one talks of the toothsome savours and wholesome qualities of the edible Fungi. Not that they are always so ready to try them; they have heard of the poisonous species, and, like certain—shall we say mythical?—beings, "they believe and tremble." But after an experiment on the vile body —of the teacher, I mean—seeing him eat fungus and not thereafter incontinently expire with his feet in his armpits, they gather courage, taste, and are converted. This I say from an instructive if brief experience. For my part I cannot help talking about Fungi whenever I can get anyone to listen, and I find the culinary and esculent aspects of Mycology will generally command attention—and not only that side of the subject either, but afterwards at any rate, the more scientific side, and that which lends itself to Nature-study. Among sundry public discourses in which I have tested the attractions of Fungi, there was one I delivered—pardon this egotism, it illustrates the subject—to our Southampton Elementary Schools Head Teachers' Association, and they evinced no little professional interest in it. You see here some diagrams and figures which I made for the occasion. I do not disguise from myself that they are not exactly brilliant from the point of view of executive faculty or artistic merit—but here let me interject that I had, among other *pièces de conviction*, a large and varied assortment of spore-maps which came in for much wondering inspection and remark, especially when I smeared them with my finger to

prove them real, and not the product of the paint-brush or the printing press. As for the text of my lecture, which I compiled with a tyro's temerity, I fear it was no great thing either; yet the fact remains that the schoolmasters behaved as though they were more than commonly interested. So it was also with a gathering of students in training, and other audiences of the usual type of local scientific societies. My small experience, then, shows that Mycology is a very attractive topic, even when presented by an advocate so poorly equipped as your humble servant; handled by masters of the subject, such as are here to-night, it will, I feel assured, be found a popular and useful branch of Nature-study. Useful I think in a high degree if it can be made to help, in soever small degree, to open the eyes and minds of the young to the things of country life. I am not indeed unmindful, as I said at the beginning, of the good that has come and does still come from the life of the town. Liberty and learning had their birthplace within its walls. But town-life has, or is beginning to have, its drawbacks and its dangers —exaggerated in some quarters though we deem them to be— and at the very least we may urge that Mother Earth has more in her lap than the pavements can yield or the gas-lamps discover. We would persuade the rising generation that the hedgerow should not be altogether abandoned for the shop-window, or the hillside be forsaken for the music-hall. We would say to the young people that the country is full of interest and charm, that they will find the study of Nature fraught with a sweet and abiding refreshment, and finally that among Nature's rich store-houses there is one chamber, often unopened, but well worthy of at least a passing glimpse, full to the door of things quaint, curious and beautiful—the Fungus Flora of our native land.

FUNGI NEW TO BRITAIN.

By Annie Lorrain Smith, F.L.S., and Carleton Rea, B.C.L., M.A., &c.

WITH PLATES X. XI. XII. & XIII.

Sordaria (Philocopra) pusilla Mout. in Bull. Soc. Bot. R., Belg. 1886, p. 146.

Perithecia small, immersed, glabrous, thinly membranaceous, pale greenish; asci cylindrical or oblong, shortly stalked, 80-90 × 20-24μ, polyspored; spores ovate-subglobose, honey-coloured, then fuliginous, about 3·5μ in diameter.

On rabbit dung, in Ecclesall Wood, Sheffield, Spring 1903, Thos. Gibb, Naturalist, May, 1905, p. 139.

Herpotrichia nigra Hartig. Hedwigia xxvii. (1888) p. 13.

Mycelium blackish-brown, broadly creeping, furnished with haustoria, occupying and destroying the leaves; perithecia globose, black, ·3 mm. in diameter, furnished with a long deflexed hair at the base; asci elongate, 76-100 × 12μ; spores in two rows, 1—rarely 3-septate, constricted in the middle, 4-guttulate.

On leaves of conifers. Found on seedlings of Scots fir in Yorkshire, by W. A. Thwaites, of Masham.

Physalospora gregaria Sacc. Syl. Fung. I. p. 435. Fung. Ital. t. 432.

Perithecia densely gregarious, covered by the epidermis, globose, shortly papillate, black, white within; asci clavate, rotund, with a thick wall, shortly stalked, 8-spored; spores distichous, ovoid-oblong, 30-40 × 6-8μ.

On branches of *Prunus*, *Salix*, *Alnus*, and *Cornus*.

On *Salix* in Connemara, causing disease of the sets, by T. Johnson, Sci. Proc. R. Dublin Soc. X (1905) p. 153 with plate.

Tetradia salicicola nomine nudum, with plate (Sphaeropsideae).

Found by T. Johnson. A stage of *Physalospora gregaria* a disease of Willows. The spores are colourless, 3-septate.

On *Salix*, Connemara. Proc. R. Dublin Soc. X (1905) p. 157.

Macrodendrophoma salicicola nomine nudum, with plate (Sphaeropsideae).

Found by T. Johnson as a stage of *Physalospora gregaria*, a

disease of Willows. The spores are fusiform, 2-celled, colourless, $12 \times 4{\cdot}5\mu$, borne on branching conidiophores.

On *Salix*, Connemara. Tom. cit. p. 158.

Hypoderma Desmazieri Duby Hyst. p. 42, tab. 11, fig. 22.

Ascophores black, shining, scattered, on both sides of the leaves, innate, ovately convex, thinly covered by the epidermis, longitudinally striate, lips closed; asci broadly clavate, sessile, paraphysate, 8-spored; spores oblong or clavate-oblong, colourless, continuous, $15\text{-}22 \times 2\text{-}3\mu$, rather narrower and more acute below.

On Pine leaves, Crediton, Devonshire, April 1905. A.L.S.

Discula Fagi Oud. Contr. Mycol. XIII. p. 53.

Perithecia imperfect, seated between the periderm and the cortical parenchyma; spores ovate, oblong ovate, or pyriform, oblong or acute at the ends, sometimes 2-guttulate $8\text{-}14 \times 3\text{-}4\mu$.

On branches of Beech. Found on dying beech seedlings in Yorkshire by Mr. W. A. Thwaites, of Masham. Naturalist 1905 p. 189.

Pleurotus decorus Fr. Hym. Eur. p. 168, Fr. Syst. Myc. I. p. 108; Fr. Mon. p. 144; Fr. Ic. p. 60, t. 60 f1 and see pl. 10 hereof.

Pileus fleshy, brittle, convex then expanded or depressed, 5-12 cm. broad, often excentric, *yellow, covered with linear bistre fibrils that become black with age.* Stem 6-10 cm. long by 1·5-2 cm. thick, stuffed then hollow, often twisted and *covered with fibrils that blacken with age* Flesh thin, pale yellow. Gills adnate or sinuato-adnate, from 5-10 mm. broad, *golden yellow*, crowded, often separating from the pileus with age, edge uneven. Taste bitter. Spores elliptical $6 \times 4\text{-}5\mu$, white, smooth with a large orbicular gutta.

Amongst heather on a rotten stock, in a fir plantation 700 feet above sea level, near Drumnadrochit, Inverness, 20th September, 1905, Mr. Angus Grant.

Easily distinguished from its allies by the bistre fibrils on the yellow pileus and stem becoming black with age and the golden colour of the gills.*

Inocybe rhodiola (Bres.) Mass. Monograph of the genus Inocybe, Annals of Botany, 1904, p. 486; Bres. Fung. Trid., p. 80, tab. 87 (forma gracilis); *Ino. frumentacea* Bres. Fung. Trid. p. 88, t. 200 (forma typica); *Ino. jurana* Pat. Tab. Anal., no. 551 (fide Bres.).

* This determination was kindly confirmed by Dr. C. B. Plowright, who had seen this species in Sweden.

Taste bitter.

Pleurotus decorus *Fr.*

E.A.Rea del. West,Newman chr.

Lactarius spinosulus *Quel.*

Hydnotrya Tulasnei. *B.& Br.*

Polystictus Montagnei *Fr.*

"Pileus fleshy, campanulate then expanded and umbonate, fibrillosely cracked, centre even, rufous-chestnut or fuscous flesh-colour, 4-8 cm.; stem fibrilloso-squamulose, becoming glabrous, vinous, apex pallid, subfloccose, 5-8 cm. long, 1-1·5 cm. thick, stuffed; flesh white, vinous at base of stem. Gills crowded, sinuato-uncinate, almost free, edge fimbriate, white then yellowish umber, often spotted with brownish umber. Spores subreniform, smooth, 10-12 × 6-8μ, some 14-15 × 8μ; *large cells on edge of gills clavate or subfusoid* 50-60 × 12-14μ. Smell resembling meal."

(1) In a field in Willey Park in cart ruts and (2) on hedge-banks in a lane at Barrow, near Broseley, and (3) under a hedge, Broad Meadows, Benthall, Shropshire, September 1905, Mr. W. B. Allen.

The appearance of this fungus strongly suggests as if it had been accidentally dropped in claret and this intensifies with age. There are *no cystidia but only the large cells on the edge of the gills*, which measure 45-60 × 12-15μ. The spores vary from 9-10 × 5-7μ, whilst others measure 12-13 × 6-8μ.

Lactarius spinosulus Quél. Soc. sc. n. de Rouen 1879 no. 48, t. 3 f. 10 Cke. Hdbk. p. 316. Mass. Fungus-Fl. vol. III. p. 31, and see pl. 11 hereof.

Spores round × 7-8μ, echinulate, very pale ochre in the mass.

On the ground under Birches and Spruce, Weston Firs, Wyre Forest, Shropshire, 5th October, 1904, Mrs. Carleton Rea.

Marasmius archyropus Fr. var. suaveolens Rea, see pl. 12 hereof.*

Caespitose. Pileus 4·5-6 cm. broad, flesh colour, becoming pale, convex then plane or depressed, *striate at the margin*, flesh thin, tough. Stem 6-7 cm. long, 2-3 mm. thick, cylindrical, slightly thickened at the apex which is paler, the residue reddish and everywhere covered with a white tomentose pruina, stuffed then hollow, twisted when dried for some days. Gills 6-8 mm. *wide*, ventricose, adnexed, separating, crowded pallid then fuscous. Spores white, globose 3-4μ. *Smell very pleasant like Marasmius oreades.*

Amongst fallen beech leaves, Grange Park, Swarraton, Hants, 30th October, 1904. C. R.

This differs from the type in the larger size and striate margin of the pileus, the wider gills and the pleasant smell like *Marasmius oreades*. *Marasmius Stephensii* B. & Br. is also characterized by the pleasant smell like that of *Marasmius oreades* but

* The cost of this plate has most generously been borne by the Rev. W. L. W. Eyre.

differs in the pileus becoming vinous red when bruised, the shining stem and distant gills. Fries in his Hymenomycetes Europaei at p. 469 cites *Stephensii* as a synonym for his *Marasmius terginus* Fr., but this is also characterized by a smooth shining stem and the spores are, according to Massee, elliptical 6-7 × 4μ. Quélet in his Fl. Mycologique at p. 319 identifies *Marasmius Stephensii* with his *Marasmius globularis* Weinm., but this certainly differs from *Stephensii* and the present variety in the globose campanulate umbonate pileus and the distant gills and the ovoid pruniform spores 8-9μ.

Polyporus benzoinus (Wnbg.) Fr. Hym. Eur. p. 554; Fr. Ic. 183 f. 2, Kalch t. 36. f. 1, and see pl. 12 hereof.

Very sweet scented and subimbricate. Pileus 9-12 cm. wide, 6-7 cm. deep, 10-20 cm. thick, *woody*, shell shaped but constricted at the base, fuscous-rubiginous, somewhat zoned, very rugose when dry and becoming darker. Tubes 6-10 mm. long, equal; orifice round or deltoid, and minute at first whitish then *ferruginous*. Flesh fuscous then pale wood. Spores *white* 4-5 × 2-2·5μ oblong, curved.

On a fallen Cedar tree, Swarraton, Hants, 17th January, 1905, the Rev. W. L. W. Eyre.

This species at first suggests a form of *Polyporus hispidus*, but a closer examination soon directs one to its true affinity. It is closely related to *Polyporus resinosus* but cannot be regarded as a variety of that species because according to Quélet the spores are ovoid brown 10-12μ, whereas the present species has white curved spores 4-5 × 2-2·5μ and is characterized by the very pleasant smell which it retains even when dry. Fries' suggestion that it might be a *Trametes* is also confirmatory of the identity of this species.

Polystictus Montagnei (Fr.). Hym. Eur. p. 530; Fr. Epic. p. 434. Quél. Jur. I. t. 17, f. 4 and see pl. 11 hereof.

Pileus 3-8 cm. broad, cyathiform, irregular, uneven, *zoneless*, ferruginous, *tomentose becoming smooth*, margin thin. Stem 2-3 cm. long by 5-9 mm. thick, unequal, ferruginous, pubescent. Flesh somewhat corky, ferruginous. Pores short, *large*, round, obtuse, edge entire, yellowish white then ferruginous. Spores 5-6 × 4-5μ ovoid, plum-shaped, punctate, hyaline. The whole plant, both externally and internally, is of a tawny cinnamon colour.

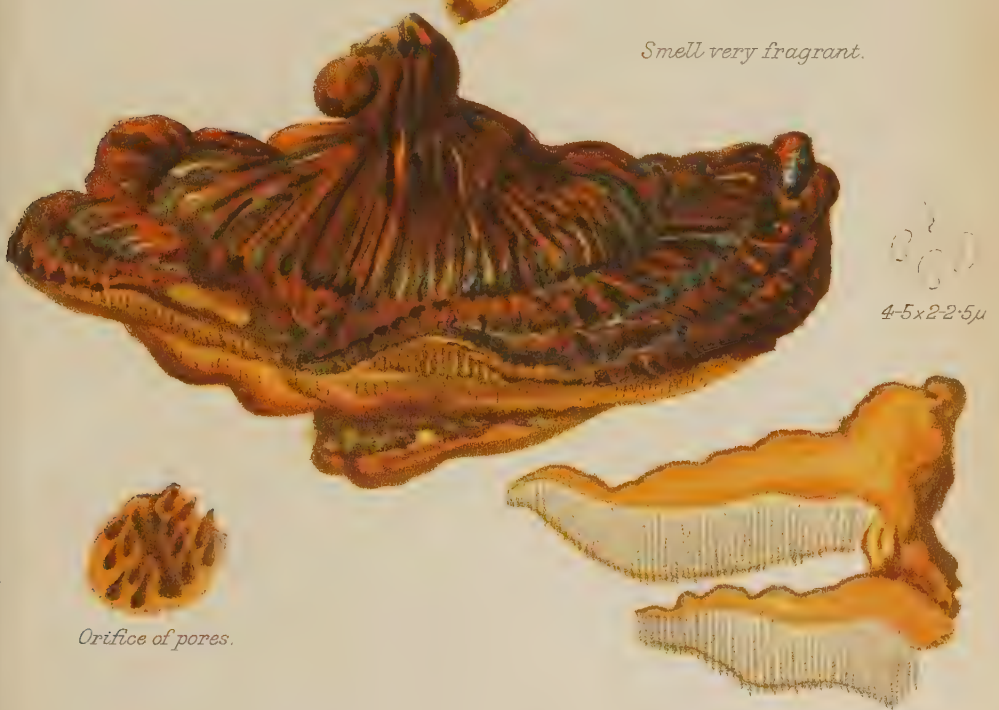
On the ground, near Grayswood Beeches, near Haslemere, Surrey, 1898, Mr. E. W. Swanton.

Easily distinguished from *Polystictus perennis* (Linn) by the zoneless pileus and large entire pores.

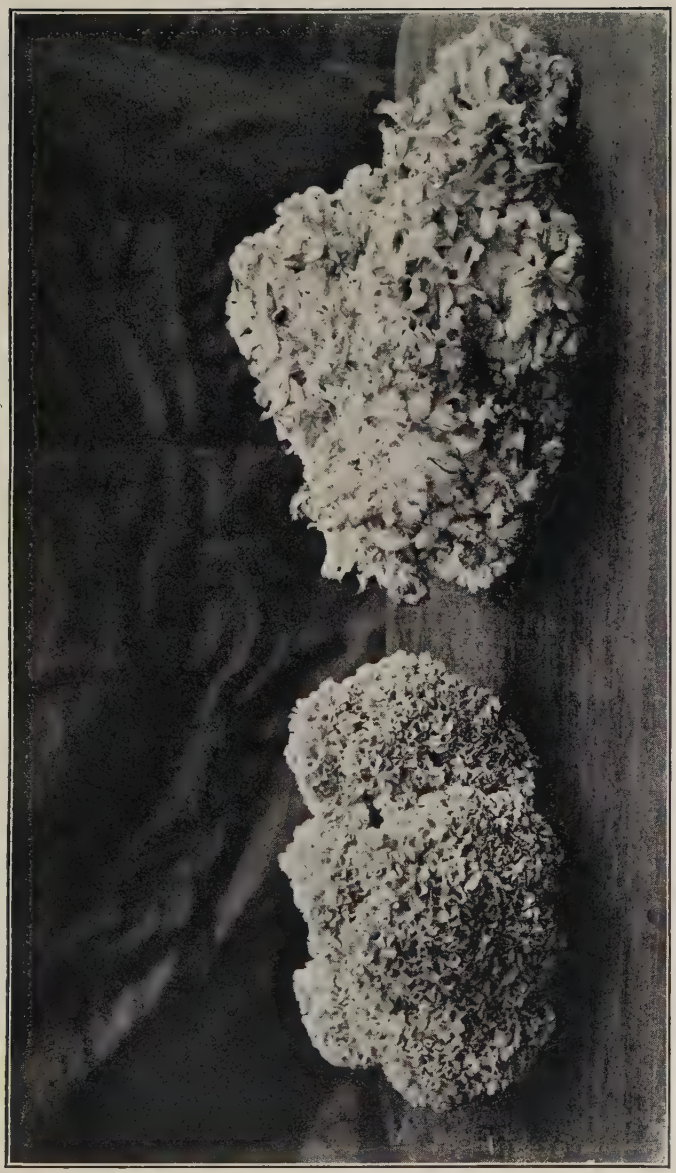
Smell very pleasant like M. oreades.

Marasmius archyropus *Fr.* *var.* suaveolens *Rea.*

Smell very fragrant.



Polyporus benzoinus *Fr.*



Sparassis crispa (*Wulf.*) *Fr.* Sparassis laminosa *Fr.*

West, Newman proc.

THE EPPING FOREST FORAY.

1st to the 6th October 1906.

The tenth annual week's Fungus Foray was held in Epping Forest, where the members assembled at the Royal Forest Hotel, Chingford, on the evening of Monday, the 1st of October, 1906. A large and commodious room in the hotel had been secured as the headquarters, and the following specimens were put out on exhibition. *Lepiota metulaespora* B. & Br., from Leytonstone, by the President (Mr. Arthur Lister, F.R.S.), *Eccilia griseorubella* (Lasch), *Flammula inopa* Fr., *Helvella crispa* Fr. and *Rhizina inflata* (Schaeff.) Quél. from Scotland by Dr. W. Watson. *Boletus parasiticus* Bull., and *Rhizopogon luteolus* Tul. from the New Forest by Mr. J. F. Rayner, who also exhibited on behalf of Mr. J. Needham a specimen of *Lycoperdon favosum* Oud.* from Hebden Bridge. *Lepiota acutesquamosa* (Weinm.) Fr. *Tricholoma melaleucum* (Pers.) Fr., *Inocybe rimosa* (Bull.) Fr. and *Russula azurea* Bres. from Kew gardens by Mr. A. D. Cotton F.L.S., *Tricholoma bufonium* (Pers.) Fr., *Pholiota flammans* Fr., *Cortinarius* (*Phlegmacium*) *triumphans* Fr., *C.* (*Dermocybe*) *orellanus* Fr., *C.* (*Telamonia*) *bivelus* Fr., *Hygrophorus agathosmus* Fr., *Lactarius vietus* Fr., *L. spinosulus* Quél and *Boletus pachypus* Fr. from the neighbourhood of Pitlochry by the Hon. Secretary.

On Tuesday, the 2nd of October, the members left the headquarters punctually at 10 o'clock, and were driven to the north-eastern portion of the Forest that adjoins Piercing Hill. The drive through the Forest revealed its leading features, the pollarded Hornbeams, open grassy glades, moorland covered with heather, pools and swampy places, all intermixed with Beeches and Oaks. The search was first made under some Scotch Pines and a few fungi characteristic of such a situation were found there, and then after proceeding under the trees some more open ground was reached and carefully worked. The President next led them to the famous Ambresbury Banks, where there is an ancient camp which tradition asserts was occupied by Queen Boadicea. After the ramparts had been duly investigated the walk was continued to the Wake Arms, from

* See The Naturalist, February, 1903.

whence the members were driven back to the headquarters. The fungi collected were at once placed out on exhibition, but only *Naucoria myosotis* Fr. and *Sclerodermis fagi* (Phillips) Mass. are worthy of note. In the evening at 8.30 at the headquarters the President presided over the annual general meeting for the election of officers for the ensuing year, when Miss Annie Lorrain Smith, F.L.S., was unanimously elected President; Mr. Arthur Lister, F.R.S., Vice President; and Mr. Carleton Rea, B.C.L., M.A., &c., Hon. Secretary and Treasurer. The Hon. Secretary then reported that he had, with the approval of their President, tendered to Mrs. H. Marshall Ward, on behalf of the British Mycological Society, their heartfelt sympathy at the irreparable loss that she and Science generally had sustained by the premature death of her husband, and assuring her that the memory of their late Vice-President would always be held in their greatest esteem and respect. Mrs. H. Marshall Ward in reply begged the Hon. Secretary to tender to the members of the British Mycological Society her best thanks and said that her husband was always very proud of the fact that he had been their President for two years and subsequently their Vice-President to the present time. The members strongly approved of what the Hon. Secretary had done on their behalf and resolved that the same should be duly set out in the report of that meeting. The invitation of their fellow member Professor M. C. Potter to visit Newcastle-upon-Tyne next year was cordially accepted, and the consideration of the invitations from the Rev. H. Purefoy FitzGerald, F.L.S., to select the neighbourhood of Wellington College, Berkshire, and Mr. Angus Grant that of Drumnadrochit were deferred until the next annual meeting. The date for the Newcastle-upon-Tyne foray was not determined, but it was not to clash with the meetings of The Cryptogamic Society of Scotland or The Yorkshire Union.† The Hon. Treasurer then reported that the sum of £25. 10s. 1d. stood to their credit at that date at the Post Office, and that since the last foray six ordinary members had been duly elected, namely, Mr. E. J. Sharpe, 130, Fenchurch Street, London; Miss Blanche Shadwell, of Trewollack, Bodmin; Mr. Gustav Natorp, of 70, Ennismore Gardens, London, S.W.; Mr. Leslie P. Newman, of Moor Hall, Shorley, Bishop's Stortford, Herts; the Rev. Walter Butt, Kempsford Vicarage, Fairford; and Edward Morell Holmes, F.L.S., F.R.H.S., of Ruthven, Sevenoaks.

The Hon. Secretary reported that early in January last The British Mycological Society was invited by Mr. F. W. Rudler, I.S.O., Hon. Secretary to the Corresponding Societies Com-

† The foray is now fixed for Monday, the 30th of September to Saturday, the 5th of October.

mittee of The British Association for the Advancement of Science, to apply to them for this Society to be put on the list of *Affiliated Societies*. In answer thereto he made the application, and on the 6th March, 1906, he received the announcement that The British Mycological Society had been placed on the list of *Affiliated Societies* "*in consideration of its local scientific work of an original character.*" This he considered very flattering and was sure it should act as a stimulus to all their members to continue to do if possible even better work. Miss A. Lorrain Smith had kindly undertaken to represent them at the recent meeting of The British Association in August last, and now they would have to decide who should represent them at the meeting of that body next year. It was unanimously resolved that their President elect (Miss A. Lorrain Smith) should be nominated to represent them, and their best thanks were tendered to her for having represented them at the York meeting. The question of life membership was next considered and after some discussion was adjourned sine die. Hearty votes of thanks were tendered to Mr. Arthur Lister for his services as President during the current year, to the Hon. Sec. and Treasurer, and to Mrs. Carleton Rea for painting the originals of the plates that appeared in their last Transactions, and to the Rev. W. L. W. Eyre for his generosity in bearing the cost of one of the plates. Mr. D. A. Boyd, of West Kilbride, Miss H. C. I. Fraser, F.L.S, and Miss E. J. Welsford, F.L.S., both of the Royal Holloway College, Englefield Green, Surrey, were then duly elected ordinary members of the Society. During the day the Rev. W. L. W. Eyre put out on exhibition an interesting example of *Merulius molluscus* Fr. from Swarraton, and Mr. W. B. Allen sent on from Benthall *Polyporus rufescens* Fr., *Trametes rubescens* (A. & S.) Fr. (new to Britain), and *Lycoperdon excipuliforme* Scop.

On Wednesday, the 3rd of October, the members were busy during the forenoon examining the finds of the previous day and at 12 o'clock hastened to welcome the members of the Essex Field Club, who were cordially invited to join in any of the forays during the week. On the arrival of Mr. B. G. Cole (Hon. Secretary of the Essex Field Club) the brake started for Great Monk Wood. This portion of the Forest was very carefully examined and the walk was continued through Little Monk Wood and by Mount Pleasant to the King's Oak Hotel at High Beach, where the brake was re-entered for the return drive. The most noteworthy species collected during the day were *Omphalia striaepilea* Fr., *Pleurotus septicus* Fr., *Pluteus hispidulus* Fr., *Pluteolus aleuriatus* Fr., *Polyporus cuticularis* Fr., and *Puccinia hydrocotyles* (Link) Plow.

In the evening the annual Club dinner was held at the Royal

Forest Hotel at seven o'clock, which was attended by Mr. Andrew Johnston (Chairman of the Essex County Council), and Mr. R. Miller Christy (President of the Essex Field Club). Afterwards at the headquarters the President (Mr. Arthur Lister) delivered his Presidential Address (see page 142), and exhibited the circulation in the plasmodium of *Badhamia utricularis* under the microscope. On Thursday, the 4th of October, the members breakfasted on some well cooked *Boletus edulis*, and subsequently continued their mycological investigations at the headquarters until after 12 o'clock. The brake was then taken to the Earl's Path, and the walk was commenced through Black Bushes and Debden slade to Loughton Camp, which the President informed the members was pre-Roman, being of very early British origin. Next a traverse was taken through a further portion of Little Monk Wood which had not been touched on the previous day, and this part of the Forest was carefully worked back to the King's Oak Hotel at High Beach, from whence the members were conveyed to the headquarters. No fungus of especial interest was gathered during the day's foray. In the evening at 8.30 at the headquarters the Hon. Secretary read a paper on "How to distinguish the species of British Lycoperda in the field," (see p. 157), illustrated by several drawings by Mrs. Carleton Rea; and also made some remarks on behalf of their member, Mr. W. B. Allen, on the differences between the species of *Trametes Bulliardi* Fr., *T. rubescens* (A. & S.) Fr., and *Daedalea confragosa* (Bolt.) Pers., specimens of which were handed round for inspection. These remarks Mr. Allen had promised to embody in a paper "A Note on Trametes rubescens" (see p. 161). The Hon. Secretary further handed round a drawing of an *Entoloma* new to science, which he had named *pulvereum* Rea, and also a drawing and original specimens of *Scleroderris bacillifera* (Karst.) Sacc. found on dead branches of Silver Fir by Mr. MacIntosh at Dunkeld, an addition to the British list. He also read a short note on "*Ozonium auricomum* Link" (see p. 166), which was followed by a discussion. Finally the paper on "How to distinguish the species of British Lycoperda in the field" was ordered to be at once issued to the members as a pamphlet. It was published on the 1st of November last.

On Friday morning, the 5th of October, a magnificent collection of rare fungi was received from their fellow member, Mr. Angus Grant, gathered by him in Rothiemurchus Forest. It included examples of *Armillaria robusta* (A. & S.) Fr. *Tricholoma equestre* (Linn.) Fr., *T. pessundatum* Fr., *T. militare* Lasch., *Volvaria volvacea* Bull., *Pholiota flammans* Fr., *Flammula astragalina* Fr., *Cortinarius* (*Inoloma*) *traganus* Fr., *Cantharellus cupulatus* Fr., *Polyporus leucomelas* (Pers.) Fr.,

Hydnum imbricatum Linn., *H. scabrosum* Fr., *H. aurantiacum* A. & S., *H. ferrugineum* Fr., and *Thelephora terrestris* Ehrh. At 12 o'clock the members left the headquarters and were driven to Honey Lane Quarters, where they left the brake and proceeded to explore the westward portion of the Forest back to High Beach. Near this spot some fine prostrate beech trunks were carefully examined and several interesting Mycetozoa, including *Physarum leucopus* Link. (first record for the Forest), *Enerthenema elegans* Bowm. and *Dictydiaethalium plumbeum* Rost. were found. The search was then continued via Fairmead Bottom on the way back to the Royal Forest Hotel. The following specimens were gathered during the day:—*Amanita spissa* Fr., *Mycena stylobates* Pers., *Irpex spathulatus* (Schrad.) Fr., *Tremella indecorata* Smrft., *Lycoperdon depressum* Bon., and *Sphacelotheca hydropiperis* (Schum.) De Bary. In the evening at the headquarters at 8.30 Mr. A. D. Cotton, F.L.S., read a very interesting paper entitled "Notes on British Clavariae" (see p. 163).

On Saturday, the 6th of October, just before the members dispersed, a person from the neighbourhood brought in some fine examples of *Lepiota rachodes* (Vitt.) Fr. and *Agaricus Elvensis* (B. & Br.) Mass. During the week's foray some 330 species and varieties were collected. Of this number over fifty are additions to a manuscript list of five hundred and forty species enumerated by Cooke and Massee of "The Hymenomycetal Fungi of Essex," which was furnished to the Hon. Secretary by Mr. B. G. Cole. These additions are denoted by an asterisk in the appended list. This result must be considered very satisfactory as up to the 2nd of October a prolonged drought for over three months had prevailed in the Forest. Miss A. Lorrain Smith subsequently reported that Mr. G. C. Hughes had handed to her a mould which on further investigation she found to be new to science and has named *Acrostalagmus galeoides* A.L. Sm. She herself gathered another rare mould *Didymocladium ternatum* B. during the foray, the second record of its occurrence in Britain.

Complete List of Fungi gathered during the Foray.

Amanita phalloides (Vaill.) Fr., mappa (Batsch) Fr. muscaria (Linn.) Fr., pantherina (DC.) Fr., rubescens Pers., spissa Fr.

Amanitopsis vaginata (Bull.) Roze.

Lepiota procera (Scop.) Fr., rhacodes (Vitt.) Fr., *amianthina (Scop.) Fr., granulosa (Batsch) Fr.

Armillaria mellea (Vahl.) Fr., mucida (Schrad.) Fr.

Tricholoma sejunctum (Sow.) Fr., albobrunneum (Pers.) Fr., rutilans (Schaeff.) Fr., terreum (Schaeff.) Fr., var. *chrysites Jungh., cuneifolium Fr.
Clitocybe clavipes (Pers.) Fr., fragrans (Sow.) Fr.
Laccaria laccata (Scop.) Berk., var. amethystina Bolt., var. tortilis Bolt.
Collybia radicata (Relhan) Fr., platyphylla Fr., fusipes (Bull.) Fr., maculata (A. & S.) Fr., butyracea (Bull.) Fr., cirrhata (Schum.) Fr., tuberosa (Bull.) Fr., dryophila (Bull.) Fr., *clusilis Fr.
Mycena *olivaceo-marginata Mass.†, pura Pers., *flavo-alba Fr., rugosa Fr., galericulata (Scop.) Pers., polygramma (Bull.), Pers., *parabolica (A. & S.) Fr., ammoniaca Fr., sanguinolenta (A. & S.), galopa Pers., leucogala Cke., epipterygia (Scop.) Pers., vulgaris Pers., *stylobates Pers.
Omphalia *striaepilea Fr., grisea Fr., fibula (Bull.) Fr., var. *Swartzii Fr.
Pleurotus septicus Fr.
Pluteus cervinus (Schaeff.) Fr. *hispidulus Fr.
Entoloma sericeum (Bull.) Fr., nidorosum Fr.
Clitopilus prunulus (Scop.) Fr.
Nolanea pascua (Pers.) Fr.
Claudopus variabilis (Pers.) Sm.
Pholiota terrigena Fr., radicosa (Bull.) Fr., spectabilis Fr., adiposa Fr., mutabilis (Schaeff.) Fr.
Inocybe *cervicolor (Pers.) Quél., carpta (Scop) Fr., fastigiata (Schaeff.) Fr., rimosa (Bull.) Fr., geophylla (Sow.) Fr.
Hebeloma fastibile Fr.
Flammula carbonaria Fr., inopa Fr.
Naucoria melinoides Fr., *tabacina DC., *myosotis Fr., *escharoides Fr.
Pleuteolus *aleuriatus Fr.
Galera tenera (Schaeff.) Fr., *spartea Fr., hypnorum (Batsch) Fr.
Tubaria furfuracea (Pers) Sm., *paludosa Fr., *inquilina Fr.
Crepidotus mollis (Schaeff.) Fr., applanatus (Pers.) Fr.
Agaricus *elvensis (B. & Br.) Massee, campestris (Linn.) Massee.
Stropharia aeruginosa (Curt.) Fr., albocyanea (Desm.) Fr., merdaria Fr., stercoraria Fr., semiglobata (Batsch) Fr.
Hypholoma sublateritium (Schaeff.) Fr., epixanthum Fr., fasciculare (Huds.) Fr., velutinum (Pers.) Fr., appendiculatum (Bull.) Fr., *hydrophilum (Bull.) Fr.
Psilocybe subericea Fr., uda (Pers.) Fr., semilanceata Fr.
Psathyra corrugis (Pers.) Fr., fibrillosa (Pers.) Fr.
Anellaria separata (Linn.) Karst.

† On Mr. Lister's lawn at Leytonstone, 6th October, 1906.

Panaeolus sphinctrinus Fr., campanulatus (Linn.) Fr., papilionaceus (Bull.) Fr.

Psathyrella *gracilis Fr., disseminata (Pers.) Fr., *atomata Fr.

Coprinus comatus Fr., atramentarius Fr., *fuscescens Fr., cinereus Schaeff., niveus Fr., micaceus (Bull.) Fr., radiatus (Bolt.) Fr., *ephemerus Fr., plicatilis (Curt.) Fr.

Bolbitius fragilis Fr.

Cortinarius (Phlegmacium) varius (Schaeff.) Fr., largus Fr., anfractus Fr., glaucopus (Schaeff) Fr., purpurascens Fr.

(Myxacium) collinitus Fr., elatior Fr., *vibratilis Fr.

(Inoloma) albo-violaceus (Pers.) Fr.

(Dermocybe) caninus Fr., anomalus Fr., sanguineus Fr. cinnamomeus (Linn.) Fr., lepidopus Cke.

(Telamonia) torvus Fr., armillatus Fr., hinnuleus, hemitrichus Fr., rigidus Fr., paleaceus Fr.

(Hydrocybe) *leucopus (Bull.) Fr., decipiens (Pers.) Fr., *acutus (Pers.) Fr.

Paxillus involutus (Batsch) Fr.

Hygrophorus laetus Fr. conicus (Scop.) Fr.

Lactarius turpis (Weinm.) Fr., blennius Fr., vellereus Fr., quietus Fr., *theiogalus (Bull.) Fr., rufus (Scop.) Fr., glyciosmus Fr., serifluus (DC.) Fr., mitissimus Fr., subdulcis (Bull.) Fr.

Russula adusta Pers., *mustelina Fr., *olivascens Fr., furcata Pers., rosacea Fr., depallens Fr., virescens (Schaeff.) Fr., lepida Fr., rubra DC., vesca Fr., azurea Bres, cyanoxantha (Schaeff.) Fr. consobrina Fr., var. sororia Larb., foetens Pers, fellea Fr., emetica Fr., ochroleuca Fr. fragilis Pers., var. *nivea Cke., var. *violacea Quél., var. fallax Cke., *puellaris Fr., alutacea Fr., armeniaca Cke. lutea (Huds.) Fr.

Cantharellus cibarius Fr., aurantiacus Fr., tubaeformis Fr.

Marasmius peronatus (Bolt.) Fr., oreades (Bolt.) Fr., erythropus Fr., *archyropus (Pers.) Fr., ramealis (Bull.) Fr., androsaceus (Linn.) Fr., epiphyllus Fr.

Lentinus cochleatus (Pers.) Fr.

Panus stipticus (Bull.) Fr.

Lenzites betulina (Linn.) Fr.

Boletus *luteus Linn., elegans (Schum.) Fr., badius Linn., piperatus Bull., *variegatus Swartz, chrysenteron Fr., subtomentosus Linn., edulis Bull., luridus Schaeff., duriusculus Schulz., versipellis Fr., scaber Fr.

Fistulina hepatica (Huds.) Fr.

Polyporus rufescens Fr., squamosus (Huds.) Fr., giganteus Fr., sulphureus Fr., hispidus Fr., cuticularis Fr., *rutilans Fr., betulinus (Bull.) Fr., *fumosus Fr., adustus Fr., lacteus Fr., fragilis Fr.

Polystictus perennis Fr., versicolor (Huds.) Fr.
Fomes igniarius (Huds.) Fr., annosus Fr., *applanatus (Wallr.) Fr.
Poria vaporaria Fr., *mollusca Fr., *vulgaris Fr., *medulla-panis Pers., *obducens Pers.
Trametes gibbosa Fr.
Daedalea unicolor (Bull.) Fr.
Merulius tremellosus Schrad.
Hydnum repandum Linn., *alutaceum Fr., *niveum Pers.
Irpex *spathulatus (Schrad.) Fr., *obliquus Fr.
Phlebia radiata Fr.
Grandinia granulosa Fr.
Craterellus cornucopioides Pers.
Stereum hirsutum Fr., purpureum Pers., rugosum Fr.
Corticium laeve Pers., *calceum Fr.
Peniophora quercinum (Fr.) Cke.
Hypochnus *violeus Quél.
Thelephora laciniata Pers.
Coniophora *arida Fr., umbrinum (A. & S.) Fr., puteana (Schum.) Fr.
Clavaria cristata Holmsk., rugosa Bull.
Pistillaria quisquiliaris Fr.
Exidia albida (Huds.) Bref.
Tremella frondosa Fr., *lutescens Pers., *indecorata Smrft.
Dacryomyces deliquescens Duby, stillatus Nees.
Calocera viscosa Fr., cornea Fr.
Cyathus striatus Hoff.
Sphaerobolus stellatus Tode.
Lycoperdon pyriforme Schaeff., perlatum Pers., umbrinum Pers., depressum Bon.
Bovista plumbea Pers.
Scleroderma vulgare Fr.
Ithyphallus impudicus (Linn.) Fisch.
Puccinia hydrocotyles (Link) Plow.
Sphacelotheca hydropiperis (Schum.) De Bary.
Pilobolus crystallinus Tode.
Sporodinia grandis Link.
Piptocephalis Freseniana De Bary.
Gymnoascus Reesii Baran.
Nectria peziza (Tode) Fr.
Hypomyces aurantius (Pers.) Tul.
Hypocrea rufa (Pers.) Fr.
Claviceps microcephala (Wallr.) Wint.
Sordaria fimicola (Rob.) Cés & de Not.
Podospora minuta (Fckl.) Wint.
Melanomma pulvis-pyrius (Pers.) Fckl.
Diatrype stigma (Hoffm.) de Not.

Hypoxylon multiforme Fr., fuscum (Pers.) Fr., coccineum Bull.
Ustulina vulgaris Tul.
Xylaria hypoxylon (Linn.) Grev.
Trochila ilicis (Fr.) Crouan.
Patellaria macrospora Phil.
Cenangium populneum Rehm.
Scleroderris fagi (Phil.) Mass.
Coryne sarcoides Tul.
Ascobolus furfuraceus Pers.
Ascophanus carneus Boud.
Mollisia cinerea (Batsch) Karst.
Helotium citrinum Fr.
Dasyscypha virginea (Batsch) Fckl., ciliaris (Schrad.) Sacc., hyalina (Pers.) Mass.
Humaria granulata (Bull.) Sacc.
Otidea aurantia (Pers.) Mass.
Sphaeronemella fimicola March.
Oedocephalum laeticolor B. & Br.
Penicillium glaucum Link.
Verticillium lateritium Berk.
Acrostalagmus galeoides A. L. Sm. n. sp.
Didymocladium ternatum Ba. (second record for Britain)
Trichothecium roseum Link.
Bispora monilioides Cda.
Cladosporium epiphyllum Mart., herbarum Link.
Stilbum erythrocephalum Ditm.
Stysanus stemonitis Cda.
Tubercularia vulgaris Tode.

Mycetozoa.

Badhamia panicea Rost., utricularis Berk. (In plasmodium condition on *Armillaria mucida*).
Physarum nutans Pers., leucopus Link. High Beach (First record for Epping Forest)
Fuligo septica Gmel.
Stemonitis fusca Roth., ferruginea Ehr., flavogenita Jahn.
Comatricha obtusata Preuss, typhoides *a* Rost.
Enerthenema elegans Bowm.
Dictydiaethalium plumbeum Rost.
Trichia varia Pers.
Arcyria albida Pers., punicea Pers.
Lycogala miniatum Pers.

PRESIDENTIAL ADDRESS.

By Arthur Lister, F.R.S., &c.

The British Mycological Society was founded at a meeting of the Mycological section of the Yorkshire Naturalists' Union at Selby, on the 19th September, 1896. After the death of Dr. Bull, the Woolhope Naturalists' Club ceased to be the resort of the leading Mycologists and the annual fungus forays had been abandoned. Hence it was suggested that the present Society should be formed to hold yearly meetings of a week's duration at different centres throughout the country, with the object of obtaining a more complete knowledge of the fungus flora of Britain and to give the opportunity of careful study of the specimens collected.

Under the fostering care and valuable assistance of our Secretary, Mr. Carleton Rea, the Society has had a prosperous experience which has amply justified its foundation; the list of its members has steadily increased and includes many distinguished names. Prof. Marshall Ward was at one time President, and it is with deep regret that we lately heard of his death; as a man of high scientific attainments and as a personal friend, we mourn his loss.

The Society has met successively at Sherwood Forest, Dublin, the New Forest, Rothiemurchus Forest, Exeter, Hereford, Savernake Forest, Whitby and Haslemere. I have had the privilege of taking part in the forays at Savernake and Haslemere, the latter centre including the rich forest of Woolmer, and thanks to the arrangements of our Secretary we obtained permission to explore woods not open to the public.

In coming to Epping Forest you may not find the abundance of material that Savernake and Woolmer afforded but in their annual fungus foray the Essex Field Club has for many years made fine collections, and has added many species new to the British flora. As a member of that Club I may express the great satisfaction we have in welcoming the British Mycological Society in their visit to our county. At the same time I may say, as a member of that Society that it gives us great pleasure that members of the Essex Field Club are joining our meeting; I would especially thank Mr. Cole for his valuable and experienced help. One feature of our time at Haslemere which was

of great interest was the day spent in Woolmer Forest. White, in his history of Selbourne speaks of the Royal Forest of Woolmer as a tract of land about seven miles in length by two and a half in breadth. He says "it consists entirely of sand covered with heath and fern, without having one standing tree in the whole extent." Now it is largely clothed with fine timber, planted by Government during the last century. White gives a delightful account of the red deer that once inhabited that Royal chase and of Queen Ann on her journey to Portsmouth watching the herd of about 500 head driven round for her inspection, and tells how later, in about 1740, the yeoman prickers were sent down to capture them all and convey them in carts to Windsor. In Epping Forest we have the remains of the vast forests that formerly covered a large part of Essex, and there is every reason to believe that it has never been under cultivation, but that the trees that established themselves in the earliest days have continued in unbroken succession to the present time.

The red deer that once abounded have now disappeared. The last of which we have any record was hunted from Hainault Forest in the year 1829, and was secured in my father's grounds at Upton. The horns were sawn off and presented to the mistress of the house and the deer was carted off to Windsor. Bell, who published his history of British Quadrupeds eight years later, in 1837, says:—"It is within the recollection of some of my friends that a few red deer still existed in Epping Forest, but they have now been extinct there for many years," so that this was probably the last survivor of the original stock. I have the horns, and value them as a relic of old Essex Natural History

James 1st introduced the hardy dark variety of fallow deer from his Scotch chases, and the deer we see in our rambles are the descendants of that stock. Roe deer were brought by Mr. Buxton from Dorsetshire a few years ago and are now well established.

Hainault Forest was a Royal chase but was disforested in 1851; now, thanks to the exertions of Mr. Buxton, a large part has been restored and public interest secured; it is being re-planted and will soon revert to being a home of wild animals.

Queen Elizabeth's Lodge, now the Forest Museum, tells of the days when that monarch, following the custom of her predecessors, hunted here.

The name of another ancient British Queen is associated with this part of the forest, for tradition tells of Boadicea having held Ambresbury Banks, or "Boadicea's Camp" as it is called, in her fierce struggle with the Romans about the time of Nero.

What remains of the earthworks show that it must have been a fortification of considerable strength.

The flora of the forest is not rich, owing to the poverty of the gravel soil; the hornbeam which forms so large a part of the timber is no doubt indigenous. You will have observed how they are all pollarded trees. Before the forest came under the protection of the Corporation of London, there were yearly forest sales by auction of "the lop and top"; the young wood was cut down over large areas every 10 years or so, and sold as faggots, poles, or peasticks, and for a long time after this cutting the shorn trunks presented a dismal appearance. They were crowded together to induce the young branches to grow up straight and close, and consequently become more marketable. When the verderers took them in hand and the "lop and top" was stopped, hundreds of the old hornbeams were thinned out, and a foolish cry was raised at the time that the forest was being destroyed; but it was a wise and necessary work, and every year the beauty of the forest is increased as the trees left have had room to grow, and it probably never presented such charming woodland scenery as it does at the present day.

Turning now to the real business of our Society, we are much indebted to those of our members who have worked hard in the field, both here and on the Continent in studying the varied aspects that many species of fungi present, and in taking in hand the difficult work of suppressing unnecessary names. I cannot but think that much remains to be done in this direction; the puzzling variation in appearance caused by differences of temperature and by the influence of wet or dry seasons in these fleeting growths make great knowledge and judgment requisite in defining the limits of species with accuracy.

It is however in the microscopic investigation of fungi that such invaluable work has been done of late years, especially in its bearing on agriculture. I need not go further than refer to the extremely interesting presidential address of Mr. Biffin, to which we listened at Haslemere, in which he described the methods pursued for combating the parasitic fungi in cereals. This is practical work which may lead to results of incalculable value.

I cannot pretend to bring before you anything of such interest; indeed the only reason for my being placed in the honorable position I now hold was that I had done something in the study of Mycetozoa, Myxomycetes, Myxogastres, or slime moulds, as different writers have called them—a very doubtful qualification one might say, for Zoologists, contend that we should not include these organisms in the Vegetable Kingdom, but class them with the Protozoa. I am not prepared to dispute the point; they appear to stand in the border land between the

two Kingdoms, and in the meantime their literature is chiefly to be sought in botanical works and their study must always be associated with that of fungi.

I have brought a few drawings to illustrate the characters of some of the different genera and to show the wonderful contrivances for the dispersion of the spores which they possess. The group may be apportioned into two main divisions—first, those that have lime in the form of *calcium carbonate* in their structure, and second, those without lime. In those containing lime, it is either in minute rounded granules incorporated in the sporangium-walls and in pockets in the capillitium—the *Physaraceae*; or the lime is deposited in more or less stellate crystals on the outside of the sporangium-wall—the *Didymiaceae*. In this division the spores are dispersed by the action of rain and wind without any special contrivance for scattering them abroad. In those without lime we meet with various structures of great beauty. In *Stemonitis* the rigid stalk is continued up the centre of the cylindrical sporangium as a columella, from which branches are given off that divide at the surface into a net, so that when the delicate membrane covering the meshes shrivels up on drying, the spores are contained in an open-work basket, and through the apertures the minute spores are blown by the wind, so minute that a single sporangium such as that figured may contain three or four millions, and so light that they float in the air and can be borne over the face of the earth. In the genus *Arcyria*, during the short time that the sporangia take in developing from the creeping plasmodium to their perfect form, a capillitium is constructed consisting of a dense network of elastic threads. This expands to many times the volume of the unburst sporangium as soon as the delicate membranous wall shrivels in drying; and by this expansion the spores are scattered far and wide and borne away by the wind. In the genus *Trichia* the capillitium consists of numerous free threads lying among the spores; these threads are marked with thickened spiral bands extremely sensitive to moisture, so that if you breathe on them as you observe them under a lens they are seen to twist and writhe, lifting the spores, and again giving them to the winds. These are a few out of many of the striking features of the ripe fruits.

And now I wish to say a few words about their life. Speaking generally, the spores of fungi germinate by sprouting. A thread is produced which branches and forms the mycelium, which everyone knows so well in mushroom spawn, and "dry rot" or "blue mould." When the spore of a Mycetozoon is placed in water, the spore-wall, or egg shell, as we may call it, breaks, and the contents creep out as an independent amoeboid body—the swarm-cell. In a few minutes the

little creature assumes something of a pear shape, and from the narrow end a whip-like thread, the flagellum, is produced, at the base of which lies the nucleus. The flagellum is indeed, as Dr. Jahn has shown, a continuation of the nuclear substance. The swarm-cell now swims about with a jerking or dancing movement caused by the lashing of the flagellum, and searches for food. I well remember the astonishment with which I first saw a swarm-cell feed. I had by me a specimen of *Stemonitis*, whose spores hatched remarkably quickly, so that within an hour after placing them in water under a cover-slip scores of swarm-cells were dancing under one field of the microscope. It happened that I had on the table, a wine glass in which a woody fungus had been soaking for a week or more, and the water was turbid with hosts of bacteria. Out of curiosity I put a drop of the turbid water to the edge of the cover-slip. Immediately the bacteria spread with rapid movements among the swarm-cells, and then I observed that most of the swarm-cells had thrown out a brush of delicate pseudopodia from the thicker end, opposite to the flagellum, and to many of these pseudopodia struggling bacteria were attached; these were gradually drawn into the body substance, where a vacuole formed round them. I have often watched the process since, and seen several bacteria enclosed in a digestive vacuole, and during the course of an hour or so have observed them to be gradually dissolved and entirely assimilated. Swarm-cells may often be seen having two or three digestive vacuoles crammed with bacteria. I have watched two swarm-cells, that had seized a bacterium longer than their own breadth by the opposite ends, contending for 20 minutes which should gain possession, with fluctuating advantage until one gave way and the bacterium was swallowed up by the victor.

Besides the dancing motion, the swarm-cells creep in a linear form with the flagellum extended in front. I once watched one of these that came in its travels upon a group of bacteria on a glass plate; the vibrating tip of the flagellum appeared to detect their presence, for the swarm-cell stopped and spread itself as a disc over the cluster; in about a quarter of an hour it again crept forward with three of the bacteria stowed away in a digestive vacuole, and soon the swarm-cell gave a lash with its flagellum, released itself from the surface of the glass, and went dancing away among its swimming companions.

A day or two after the swarm-cells have hatched they begin to increase in number by bipartition; the flagellum is withdrawn, the swarm-cell takes a globular form, and the nucleus divides by karyokinesis. In the course of about a quarter of an hour the two halves of the nuclear plate separate and the globular swarm-cell becomes ellipsoid; then a constriction takes place, the cell divides, and each half resumes the form of the parent, and puts

out a lashing flagellum. An interesting article was published by Dr. Jahn in 1904, in which he shows that in some species of Mycetozoa the flagellum is produced before the separation of the daughter swarm-cells, and is seen to be a continuation of the achromatic fibres of the nuclear spindle; he considers the darkly staining point at the base of the flagellum is the centrosome. We have had the privilege of seeing his beautiful preparations.

It is uncertain how often the swarm-cells divide; the division can be followed for three or four times, and probably the number varies according to circumstances, but eventually the tendency to divide ceases, the flagellum is withdrawn, and the swarm-cells creep about in amœboid form. At this stage, when they meet in their wanderings they fuse together, though their nuclei remain distinct, and when a number have thus coalesced they appear to act as centres of attraction towards which others converge until the *plasmodium* with its rhythmic streaming of circulation is produced. The rapid flow, as we see it under the microscope is always an impressive object, the more so perhaps because it is so difficult to explain. In the creeping swarm-cell, the changing currents in the granular protoplasm are very similar to what we observe in an amœba, and the streaming of the plasmodium is a further development of that movement on a large scale. Under normal conditions the flow proceeds through the net-work of channels for a minute and a half, when it stops and immediately reverses its course, maintaining a rhythmic change backwards and forwards at nearly equal intervals of time but always rather longer in the direction in which the mass is advancing.

The plasmodium condition is the main stage in the life of the organism; the dividing of the swarm-cells at the beginning of the cycle and the formation of spores at its close occupy a very short time as compared with the prolonged existence of the plasmodium, which may last for weeks or months or perhaps years.

The plasmodium of nearly all the Mycetozoa appears to feed on decayed vegetable matter, either dead leaves or rotten wood. One species only, to my knowledge, devours living fungi; this is *Badhamia utricularis*; it preys principally on different species of *Stereum* and is abundant in our Forest when *Stereum hirsutum* is plentiful. This circumstance is favourable for its cultivation. It readily passes into the sclerotium or resting stage when deprived of moisture, in which state it can be preserved for several years without losing its vitality.

The photograph on the wall represents the plasmodium of this species which had been induced to creep over a thin coverslip; it was killed with absolute alcohol, stained with magenta, and mounted in Canada balsam. The dark turgid edge along the top shows where it was advancing, forced forward by the

flow that was pouring into it from the network of veins you see below—channels is a better word than veins, for there are no vein walls—the whole mass is in motion, but it is in these vein-like branching and constantly shifting channels that the main rhythmic streaming takes place.

A method for the preparation of pure sclerotium I have lately adopted may perhaps be worth mentioning. A portion of the sclerotium of *Badhamia utricularis*, soaked in water, is placed on a pileus of *Stereum* on a dinner plate under a bell-jar; it revives in the course of a few hours, and the plasmodium spreads over the fungus; as it grows we add fresh *Stereum* every morning and the exhausted pieces are cleared away. In the course of a fortnight or so the cultivation is thus led round the plate in a circle. When the plasmodium has increased sufficiently, the bell-jar is removed and the growth is left exposed for two days; then folded strips of wet blotting paper are laid with one end resting on the pile of *Stereum* and the other end lying on the clean part of the plate; these are covered by a plate of glass to prevent rapid evaporation, but the pile is left uncovered; the plasmodium, attracted by the moisture, leaves the *Stereum* and spreads over the wet blotting paper, on which it discharges its refuse matter. When it has spread sufficiently the plate of glass is removed and it is left to dry and form the clean sclerotium such as you see here. If a bit of the blotting paper one-eighth of an inch square thus coated with dry sclerotium is soaked in water and placed on a thin cover slip inverted over a moist chamber, such as a ring of four thicknesses of wet blotting paper on a glass slide, the plasmodium will revive in a few hours and the streaming can be watched under the microscope.

The causes that produce the change of the plasmodium into sporangia are not always easy to trace; want of nourishment is perhaps the principal one. If the plasmodium spreading over the wet blotting paper just described were allowed to remain moist, sporangia would form in four or five days, but if kept supplied with *Stereum* it would continue to grow for months. On the other hand *Didymium difforme* may go through the whole cycle from spore to sporangium in about a fortnight. When the change comes, the whole of the plasmodium participates in the formation of the fruit; a part is applied to the construction of the hypothallus and stalk, part to that of the sporangium-wall and capillitium, and the remainder is divided up into spores.

As already stated, at the time of the bipartition of the swarm cells the nuclei divide by karyokinesis; during the active life of the plasmodium, when of course they multiply enormously, a great number of observations with different species lead to the conclusion that they divide by constriction, or simple division.

Once, and once only, to my knowledge, has mitosis been observed in the streaming phase. This was in a preparation of *Badhamia utricularis* made by my son, J. J. Lister, F.R.S., a few days after the plasmodium had been revived from sclerotium. Here, every nucleus shows the spindle with the two halves of the equatorial plate just separated. It is an important and suggestive occurrence, and the question arises, how often does it take place, and what precedes or follows this exceptional process of division, if it be exceptional at this stage? After the capillitium has formed in the sporangium, all the nuclei divide by karyokinesis and each daughter nucleus becomes the centre of a spore.

There is something that appeals to the imagination in the thought that in a sporangium like that of the *Stemonitis* which we see drawn before us, after this delicate framework had been formed, there remained the spore material, containing, say, 2,000,000 nuclei. Then, simultaneously, each nucleus divided, so that there were 4,000,000 nuclei, and these, so nicely apportioned in number to the mass of the spore substance with which they had to deal, that in a few minutes it became divided up into 4,000,000 spores, all equal in size. An hour or two later and the spores were ripe, each enclosed by a spore-wall so minutely sculptured that the pattern can only be made out with our highest glasses, and yet that pattern is constant in this species all over the world.

I have dealt at perhaps tedious length with the microscopic aspect of the Mycetozoa, and of course without the microscope little knowledge can be gained of them; but they are beautiful objects even in the field, and to those who search for fungi with an eye a little trained to detect their minute forms, they are seen to abound in wet seasons among dead leaves and on old stumps. Then they have the advantage of being easily preserved; with moderate care to protect them from damp and insects they will last indefinitely, and remain as fit for microscopic examination as when first gathered. We have lately received them in perfect condition from Japan, Brazil, New Zealand, and from Ceylon where our friend Mr. Petch who used to join our Fungus Forays is making very valuable collections.

QUELQUES RECTIFICATIONS ET OBSERVATIONS CRITIQUES SUR LES "ILLUSTRATIONS OF BRITISH FUNGI" DE COOKE.

Par M. Em. Boudier.

Dans un ouvrage aussi important que les "*Illustrations of British Fungi*" de *Cooke*, il est impossible que sur la quantité d' espèces figurées il ne s'en trouve quelques unes qui soient représentées sous des noms qui ne sont pas exacts, ou dont l' exécution faissant à désirer, ne les rende peu reconnaissables. Il m'a semblé que quelques rectifications ou observations critiques pourraient avoir quelqu' utilité sans nuire en rien à la réputation de ce bel ouvrage consulté journellement par tous les mycologues. Cette note n'est d'ailleurs que le résultat de mes observations personnelles prises parmi celles qui m'ont le plus frappé, laissant de côté le plus grand nombre des espèces que je regarde comme bien nommées, ou sur lesquelles ne les ayant pas vues en nature je ne puis me prononcer. Voici donc ce que je crois pouvoir dire :

Pl. 1. *Amanita virosa* Fr. Forme robuste. Cette espèce est habituellement plus grêle.

2., ——— *phalloides* Fr. Je regarde cette planche comme représentant plutôt l' *Amanita mappa* var. *citrina* Schaeff. que *phalloides* qui est habituellement à chapeau olivâtre.

3. ——— *verna* Bull. Par son bulbe cette figure ne représente certainement pas *Am. verna* mais bien *A. mappa* var. blanche et sans verrues.

7. ——— *excelsa* Fr. Couleur trop verdâtre.

8. ——— *strobiliformis* Fr. Mais couleur anormale.

10. ——— *aspera* Fr. Var. à verrues blanchâtres.

34. ——— *magnifica* Fr. Cette planche cadre bien avec celle du *Flora Danica.* mais je les crois toutes deux être une aberration d'*Am. rubescens.*

11. ——— *megalodactyla* Berk. Cette figure ressemble beaucoup à une petite forme de *lenticularis.*

35. ——— *adnata* Smith. Ne parait pas differer de *junquillea* Quél. nom postérieur. C'est aussi à mon avis l'*Oronge sucrée* de Paulet nom au contraire antérieur.

27. *Lepiota hispida* Lasch. Cette planche me parait représenter une varieté de *L. clypeolaria*. *L. hispida* est autre et est représentée mieux sur la planche 1180.

15. ——— *Naucina* Fr. Me parait plutôt appartenir à *Psalliota cretacea*.

5. ——— *Cepæstipes* Sow. Les figures inférieures seulement, les supérieures représentant *L. lutea* With. ou *flos-sulfuris* Schn.

18. ——— *granulosa* Batsch. Les figures supérieures seulement les inférieures devant être rapportées à *carcharias*.

213. ——— *granulosa* var. *rufescens* B. & Br. Me parait représenter *L. sistrata* Fr.

33. *Armillaria aurantia* Schaeff. Doit être rapportée à *rufa* Alb. et Schw.

47. *Armillaria subcava* Sch. Doit être regardée comme *serena* Fr. ou *Brebissonii* Gill.

72. *Tricholoma equestre* Linn.! Mais variété.

54. ——— *portentosum* Fr. Ne représente pas cette espèce qui a un tout autre aspect sans que je puisse préciser laquelle.*

76. ——— *acerbum* Bull. Me parait bien cette espèce, mais la couleur est beaucoup trop rousse et trop foncée.†

58. ——— *flavo-brunneum* Fr. Par ses lamelles blanches et non jaunâtres, ces figures représentant plutôt *Trich. stans*.

60. ——— *imbricatum* Fr. Doit être rapporté plutôt à *vaccinum*.‡

50. ——— *terreum* Schaeff. Cette planche représente mal le tomentum du chapeau qui n'est jamais strié.

* This is generally taken for *Collybia platyphylla*, see vol. 1, p. 41.—C.R.

† This defect of colour was pointed out by Dr. M. C. Cooke himself, see Grevillea, vol. 19, p. 37.

‡ This was subsequently so corrected in Handbook of British Fungi, 2nd edition, p. 30, and Grevillea, vol. 19, p. 37.

166. ——— *cartilagineum* Bull. Ce n'est pas l'espèce type de Bulliard qui est représentée ici et qui est tout autre, mais celle de Fries qui rentre dans le groupe des *terreum.*

93. ——— *tumidum* Pers. Ces figures ressemblent plus à *Trich. portentosum* qu' à *tumidum.*

94. ——— *lascivum* Fr. Figures trop grêles. Je doute qu'elles appartiennent à cette espèce

229. ——— *albellum* Fr. Couleur trop jaune.

69. ——— *album* Fr. Couleur beaucoup trop jaune.

67. ——— *nudum* Bull.
133. ——— *nudum major.* } Ces deux planches représentant plutôt *Trich. personatum.*

99. ——— *humile* Fr. Les figures inférieures se rapportent plutôt à *Trich. sordidum.*

263. ——— *humile* var. *blandum* Berk. Est plutôt une variété pale de *melaleucum.*

200. *Clitocybe rivulosa* Fr. ! Mais mal représenté.

280. ——— *elixa* Sow. Planche représentant plutôt *Cl. inornata* du même auteur.

136. ——— *gilva* Pers. Non! mais forme d'*infundibuliformis*! *gilva* est beaucoup plus robuste, plus épais.

84. ——— *flaccida* Sow. Est plutôt *inversa.**

137. ——— *lobata* Sow. N'est qu'une forme d'*inversa.**

127. ——— *Sadleri* Berk. Est *Hypholoma fasciculare* resté stérile.

267. *Collybia acervata* Fr. C'est à mon avis plutôt *Marasmius erythropus.*

269. ——— *lacerata* Lasch. Me parait représenter plutôt un *Inocybe.*

241. *Omphalia pseudo-androsacea* Bull. Figures beaucoup trop blanches et ne représentant pas cette espèce qui est plus petite plus grise et à lames plus écartées.

227. *Pleurotus ulmarius* Fr. Figures un peu trop colorées.

195. ——— *ostreatus* Fr. Ce n'est pas cette espèce mais *Pl. sapidus* Kalchbr. Le pied n'étant pas hirsute.

* Dr. M. C. Cooke suggested they were all forms of one species, Grevillea, vol. 19, p. 37.—C.R.

196. ——— *ostreatus* var. *euosmus* Berk. Me parait encore être *Pl. sapidus.*

517. *Pluteus ephebius* Fr. Planche douteuse, le chapeau est trop pâle pour cette espèce.

518. ——— *semibulbosus* Fr. N'est pas cette espèce, le chapeau est trop blanc et trop largement cannelé.

598. ——— *roseo-albus* Fr. Cette planche par les spores rondes et échinulées doit représenter *Pleurotus subpalmatus.*

422. ——— *phlebophorus* Dittm. var. *reticulatus* Cke. N'est qu'une forme déjà figurée par Richon sous le nom d'*Entoloma Cookei*, de *Pleurotus subpalmatus* dont la pellicule gélatineuse du chapeau s'est contractée en alvéoles par dessication. Les spores sont les mêmes.

313. *Entoloma repandum* Bull. Est à mon avis un *Inocybe.*

581. ——— *liquescens* Cooke. N'est pas un *Entoloma* mais probablement un état jeune et très frais de *Psilocybe spadiceo-grisea.*

470. ——— *frumentaceum* Bull. Doit être placé dans les *Tricholoma* par ses spores non anguleuses.

319. ——— *clypeus* Fr. = *clypeatum* Fr.

377. *Nolanea mammosa* Fr. C'est bien cette espèce mais la couleur est trop pâle.

345. *Acetabularia acetabulosa* Sow. Cette planche reproduit assez bien le *Pluteus semibulbosus* et mieux que celle de Sowerby dont elle n'est cependant que la copie.

348. *Pholiota caperata* Pers. Mauvaises figures ne représentant pas cette espèce mais peut-être une variété d'*aurea.***

349. ——— *terrigena* Fr. Ces figures qui ne reproduisent pas la véritable *Phol. terrigena*, doivent être rapportées à *Flammula ochrochlora.*

362. ——— *pudica* Fr. Est plutôt *Phol. ægerita* recoltée par un temps sec.

363. ——— *leochroma* Cooke. Ne me semble qu'une forme d'*ægerita.*

** The original of this plate was named *aurea* by Phillips and was from Den of Airlie in Scotland, W.B.A.

364. ——— *capistrata* Cke. Est encore *Ph. ægerita* récoltée par temps humide.

453. ——— *ægerita* Fr. Même espèce mais forme robuste.

365. ——— *ægerita* Fr.! Mais variété.

370. ——— *tuberculosa* Schaeff. Me parait être *Phol. squarrosa* var. *verruculosa.*

354. ——— *Cookei* Fr. Est *Flammula ochrochlora* sans aucun doute!

356. ——— *unicolor* Fl. D. Me parait être *marginata* par ses lamelles étroites et sa station sur Mélèze.

503. ——— *mycenoides* Fr. Ces figures me paraissent devoir être rapportées plutôt à *togularis* qu'à *mycenoides.*

425. *Inocybe cincinnata* Fr. Ne peut être cette espèce par ses spores qui sont figurées verruqueuses.†

381. ——— *Bongardii* Fr. Ces figures diffèrent complètement de Bongardii figuré par Fries dans ses *Icones selectæ.*

395. ——— *echinata* Roth. Est bien l'espèce de Roth., mais c'est la vrai *Agaricus hæmatospermus* de Bull. nom antérieur, et c'est plutôt une Lépiote.

454. ——— *fibrosa* Sow. L'espèce de Fries est différente! Je crois l'espèce figurée par Sowerby et dont la couleur est certainement passée, identique à *In. incarnata* de Bresadola.

416. ——— *Hebeloma longicaudum* Fr. var. *radicatum* Cke. Me parait devoir être rapportée à *Flammula lenta.*

431. *Flammula gymnopodia* Fr. Ne peut être cette espèce, mais bien *Fl. sapinea.*

439. ——— *lenta* Fr. Est plutôt *Flammula gummosa.*

511. *Naucoria sobria* Fr. var. *dispersa* B. & Br. Est plutôt *pusiola.*

521. *Psalliota augusta* Fr. Je regarde cette planche comme reproduisant *Psalliota campestris* var. *villatica* De Brondeau.

535. *Stropharia coronilla* Bull. Est plutôt *melasperma* var. *lutescens* surtout la figure A.

† This is referred to *I. lanuginosa* Bull. by Bres. Fung. Tri., vol. 1, p. 101.—C.R.

543. *Hypholoma storea* Fr. var. *cæspitosa* Cke. Est *Stropharia cotonea* Quél.

566. ——— *lacrymabundum* Fr. Est identique à *Stroph. caput-Medusæ* Pl. 540 et non à *lacrymabundum* Bull.

571. *Psilocybe atro-rufa* Schaeff. Couleur trop violette et taille trop grande pour être cette espèce.

573. ——— *semilanceata* Fr. var. *cærulescens* Cke. Cette planche ne peut certainement pas représenter cette espèce même comme variété.

625. *Panœolus fimiputris* Fr. Doit être rapporté à *campanulatus* par son pied rougeâtre.

656. *Psathyrella prona* Fr. La fig. A doit être rapportée à *Ps. disseminata.*

704. *Cortinarius infractus* Fr. Couleur trop jaune et pas assez olivâtre.

705. ——— *anfractus* Fr. Est probablement *infractus.*

711. ——— *talus* Fr. Est plutôt une forme de *multiformis.*

735. ——— *prasinus* Fr. Les figures sont trop jaunes.

849. ——— *herpeticus* Fr. Doit être rapporté à une des formes de *Cort. glaucopus.*

728. ——— *cristallinus* Fr. Est probablement *causticus* par sa chair colorée.

738. ——— *collinitus* Fr. Est *mucosus* Bull. ou *collinitus* var. *mucosus* de Fries.

739. ——— *mucosus* Fr. Représente plutôt *C. arvinaceus.*

740. ——— *mucifluus* Fr. Est *collinitus* typique. La fig. que donne Sowerby sous ce nom est *elatior.*

758. ——— *Bulliardi* Fr. Nom exact, mais mauvaise figure.

749. ——— *cotoneus* Fr. C'est pour moi *sublanatus.*

770. ——— *violaceus* Fr. Non! C'est une forme de *purpurascens.*

764. ——— *penicillatus* Fr. Mauvaise figure par conséquent douteuse.

787. ——— *orellanus* Fr. N'est pas cette espèce et est *brunneo-fulvus* suivant Quélet. *Orellanus* est plus grêle et de coloration plus dorée.

852. ——— *bivelus* Fr. N'est certainement pas cette espèce mais très probablement *laniger.*

801. ——— *torvus* Fr. Est plutôt une forme d'*impennis,* tandis, que *Berkeleyi* représenté Pl. 706 et 707 serait le type de *torvus.**

866. ——— *evernius* Fr. Me parait représenter la forme à pied violacé d'*elatior.*

808. ——— *subferrugineus* Fr. Est *C. caninus.*

859. ——— *unimodus* Britz. Ne différe pas d'*erythrinus.*

875. *Paxillus involutus* Fr. Coloration trop jaune.

929. ——— *leptopus* Fr. Figuré avec les lamelles beaucoup trop écartées.

876. ——— *atro-tomentosus* Fr. Couleur trop rouge.

878. ——— *panuoides* Fr. Couleur trop citrine.

931. *Hygrophorus nemoreus* Fr. Ne me parait pas être cette espèce mais peut-être une forme de *leporinus.*

981. *Lactarius exsuccus* Otto. N'est autre que *Russula delica.*

999. ——— *volemus* Fr. Figures de couleur trop jaune et pas assez briquetée.

1012. ——— *serifluus* DC. La coloration n'est pas assez brune.

1001. ——— *mitissimus* Fr. Figures trop jaunes.

1017. *Russula densifolia* Gillet. N'est que *R. adusta* jeune.

1037. ——— *sardonia* Fr., var. Non! ce doit être *ochroleuca, sardonia* étant rouge et n'ayant pas les lames jaunâtres.

1072. ——— *lepida* Fr. Représentation mauvaise comme couleur et prise sans doute sur des échantillons décolorés.

1073. ——— *lepida* Fr. var. Est plutôt *depallens.*

1087. ——— *rubra* Fr. var. *sapida.* Est *R. atro-purpurea.*

1075. ——— *vesca* Fr. Ne représente pas cette espèce mais plutôt *cyanoxantha.*

1074. ——— *xerampelina* Schaeff. Oui! mais la figure inférieure doit être rapportée à *fusca* Quél.

* Surely Massee is right in considering this species as defined by Quélet to be a true Phlegmacium. Fries' description is quite different.—C.R.

1044. ——— *heterophylla* Fr. Me paraît devoir être plutôt rapportée à *olivascens*.

1127. *Marasmius candidus* Fr. Cette espèce est peut être le *M. candidus* de Fries, mais l'espèce de Quélet est tout autre.

955. *Armillaria Jasonis* Cke. & Mass. N'est probablement que *Lep. amianthina* développée luxueusement sur un substratum très nourrissant.

HOW TO DISTINGUISH THE SPECIES OF BRITISH LYCOPERDA IN THE FIELD.

By Carleton Rea, B.C.L., M.A., &c.

Our member, the Rev. W. L. W. Eyre, has asked me to give the Society some notes on the genus LYCOPERDON which will enable the student to identify the British species in the field and it is with that object in view that I offer these imperfect observations. I do not think our English text books set out sufficiently and definitely the nature and character of the exoperidium in this genus, and as far as I am aware the illustrious Doctor Lucien Quélet was the first person to make this the basis of the sub-divisions of this genus in his work "Les champignons du Jura et des Vosges." Now to thoroughly appreciate the characters of the exoperidium it is necessary to gather the specimen in a fresh and nice growing condition and uninjured as to its external features, although it may be immature when sectioned and so would not disclose the nature of the gleba as to the colour of the spores in mass and capillitium, the presence or absence of a diaphragm between the fertile and sterile tissue, and the presence or absence of a well-defined columella. To elucidate these points it is always advisable if possible to secure a specimen of the same species in a riper and more mature condition and then if we have these two factors present we ought without much difficulty to be able to identify the species in the field.

If the exoperidium is *very slightly tomentose and becomes smooth* like a kid glove it is LYCOPERDON BOVISTA Linn.; if it is covered only with *mealy granules* it is LYCOPERDON PUSILLUM Batsch, or LYCOPERDON CEPAEFORME Bull.*; if it consists

* *Pusillum* has no sterile base, *Cepaeforme* has a sterile base of minute cells.

of a *very friable, white, floccose membrane* which breaks up into *evanescent, star-shaped rosettes and flakes and forms a false ring-like* appearance at the apex of the sterile basal stratum and *finally disappears almost completely* it is LYCOPERDON VELATUM Vitt; if it is covered with *very floccose, pyramidal or flattened warts surrounded by a mesh work of furrows* that give it a *tessellated appearance* it is LYCOPERDON CAELATUM Bull.

In the five following species the exoperidium is characterized by having the *spines separate at the base but drawn together more or less at the apex into a point.* If the exoperidium is covered with *spinulose warts which are united at the apex and intermixed with minute simple spines and furfuraceous granules* all of which *wear away with age* it is LYCOPERDON DEPRESSUM Bon.; if it is *bristling with very long, curved, crowded, rigid, light coloured spines** which are *surrounded at the base by a circle or tessellated group of brown warts* it is LYCOPERDON ECHINATUM Pers., if the spines are *shorter and of medium size* and the capillitium is *olive* it is LYCOPERDON HOYLEI Berk.; if it is *tomentose with floccose spines which fall away in flakes* it is LYCOPERDON EXCIPULIFORME Scop.; if it is covered with *short, rigid, fragile spines and granules which agglomerate together in circles which are larger at the centre, and are either mucronate or reduced to flat brown warts* it is LYCOPERDON SACCATUM Fr.

In the rest of the British species of Lycoperdon the *spines* of the exoperidium are *pointed, free from one another* and only *very rarely united at their apices.* If the exoperidium is covered by a series of *flattened soldered warts* it is LYCOPERDON GEMMATUM Fl. D.; if it is covered with a series of *long, straight, rigid, fragile, caducous spines* which are *surrounded at their bases by circles of short warts* it is LYCOPERDON PERLATUM Pers.; if it is covered more or less with *short, thin, crowded, fragile, pointed, caducous warts* which are *more pointed and acicular generally on the stem* it is LYCOPERDON PYRIFORME Schaeff., and if it presents a *tessellated and spotted appearance* it is the variety TESSELLATUM Pers.; if it is *bristling with thin, crowded, soft, rigid, fragile bistre spines* it is LYCOPERDON UMBRINUM Pers., and if it is covered with *slender, soft spines that wither away* it is LYCOPERDON ATROPURPUREUM Vitt.

If there are *cord-like rooting strands of mycelium* attached to the base of the specimen then we have either LYCOPERDON ECHINATUM, HOYLEI, CEPAEFORME or PYRIFORME to deal

* C. G. Lloyd in his work "The Genus Lycoperdon in Europe" at p. 208 says that "the cortex has long *black* spines." I have never gathered them in this condition. and should think that this colour must be due to some preservative that had been used,

with, but this last species is separated from all other British Lycoperdons by its *lignicolous habit* and usually *caespitose growth*, the others being *terricolous* and growing *singly* with the exception of LYCOPERDON PERLATUM which is often found growing in pairs. LYCOPERDON CAELATUM is often characterized by having *a long tapering root* but its *large size* separates it along with LYCOPERDON BOVISTA from the rest and among the smaller ones LYCOPERDON PUSILLUM is the only one where the attenuated base is continued as a *long, slender, tapering root.*

I have now dealt with the main external features and I will now consider the internal characters as presented by a section of a mature specimen cut in the field.

If we find that the gleba is a *homogeneous mass of spores and capillitium* it is if *large* and *smooth* on the outside LYCOPERDON BOVISTA*, if *small* and *mealy* LYCOPERDON PUSILLUM; but if it is *divided up into a cellular, sterile, basal stratum* which is *distinct from the spores and capillitium* and if moreover these two portions are *separated from each other by a well developed diaphragm* it is either LYCOPERDON CAELATUM or DEPRESSUM. The former, as I said previously, is of *large size* whilst the latter is of *small size* and the *threads of the capillitium* are *colourless.* The upper portion of the endoperidium in both these species falls away in pieces and leaves the spores and capillitium as it were in an open goblet and it is in this condition that we often meet with it. If there is *no diaphragm* between the fertile and the sterile portions of the gleba but *the sterile portion is continued into a columella* from which the spores and threads of the capillitium spring it is either LYCOPERDON PYRIFORME or PERLATUM, but these are easily separated by the external markings of the exoperidium.

If the *cells of the sterile basal portion are very minute* it is LYCOPERDON CEPAEFORME but if they are *large and whitish* it is LYCOPERDON COOKEI† which C. G. Lloyd identifies with LYCOPERDON SPADICEUM Pers.

If the *spores in mass* appear to be *purplish* in hue then it is either LYCOPERDON ECHINATUM, HOYLEI or ATROPURPUREUM, but to further elucidate the characters of the spores resort will have to be made to the microscope at home and I have already indicated the features by which they may be recognised in the field.

I must now say some concluding words about the microscopic characters of the spores because George Massee in his Fungus Flora, vol. i., has divided the species into those with rough spores and those with smooth spores, but I feel quite sure that

* Lycoperdon Bovista sometimes develops a slight sterile basal stratum.
† This is unknown to me.

most of our members who have carefully examined the British Lycoperda spores will agree with me in saying that none of them are perfectly smooth if submitted to a Zeiss J water immersion objective. It would therefore be much better to classify our British species under two sections only as proposed by C. Van Bambeke in his paper in the Bulletin de la Société Mycologique de France,* namely, the *Asterosporae* and *Subasterosporae.* Under the *Asterosporae* we should range the *large echinulate spored* LYCOPERDON ECHINATUM, HOYLEI, ATROPURPUREUM, VELATUM and SACCATUM, and the *Subasterosporae* would include the remainder with *generally smaller, olivaceous spores.*

In this brief review I have excluded some species of Massee enumerated thereunder as LYCOPERDA in his work as I consider the British BOVISTAE have distinct characters of their own in having *free, pointed threads of capillitium.* Nor can I agree with C. G. Lloyd's definition of Morgan's genus CALVATIA which he separates from LYCOPERDON on the ground that the *peridium breaks up in its upper portion and has pedicellate spores* in the former, whereas the latter is characterized by *opening by a definite mouth and non-pedicellate spores,* but if he is consistent then his *Pratense* section of Lycoperda ought to be transferred to the former genus, as I take it that his LYCOPERDON PRATENSE is identical with my LYCOPERDON DEPRESSUM Bon.,† but as he gives no authority for his names it is impossible to trace this. Equally his creation of BOVISTELLA for the *pedicellate spored species* of Lycoperdons will not hold water, as we have many of these in other species of Lycoperda, and for example I cite LYCOPERDON ATROPURPUREUM.

I should add that an *elongated cylindrical form of* LYCOPERDON PYRIFORME is known as the var. EXCIPULIFORME (Desm.) and that a *smaller, club-shaped, yellower* form of EXCIPULIFORME is the variety FLAVESCENS of Quélet.

In the external characters I omitted to mention that LYCOPERDON PERLATUM is *umbonate* and PYRIFORME *rather umbonate.*

LYCOPERDON EXCIPULIFORME has the threads of the capillitium *sparingly or not at all branched* and COOKEI has them also *unbranched.*

* See vol. xxii. p.p. 27 and 28.

† By the laws of priority this plant should be known as *L. hyemale* (Bull.) Vitt. Hollós Gastero. Ung., p. 170.

A NOTE ON TRAMETES RUBESCENS.

By W. B. Allen.

With Plate 16.

In August and September, 1906, there occurred on *Salix caprea* at Willey, Shropshire, a Trametes which is perhaps worthy of a note.

On the first occasion that it was noticed the specimens were immature, being roundish irregular masses oozing out of the wood. The pilei varied from whitish to olive-brown in colour and were characterized by a dense pulverulence so that, when touched, every finger-mark remained imprinted.

On later inspection the fungus became dimidiate with a very decurrent base, the pileus became zoned and the pores were seen to be white and the orifices roundish becoming elongated and daedaliform in age, especially towards the margin.

The striking feature about the fungus, which could not fail to immediately arrest attention, was that the pores and flesh at once changed, on being scratched, from white to a beautiful crimson-lake colour, in some specimens almost to blood-red. On being dried, the whole hymenium naturally changed to a pinky-tan.

In our English handbooks there appeared to be nothing at all near to it except *Trametes Bulliardi*, which is a fungus we have often gathered, but never saw it change to crimson on being wounded: further *Bulliardi* is a sweet-scented species, whereas this was entirely odourless. On referring to Fries' Hymenomycetes Europaei we found that he mentioned a *Trametes rubescens* which seemed to fit most admirably, the chief points in the description being "ubique rubescens, junior albo pruinosa."

This species is not in our British Flora, moreover Fries had not seen it growing, and adds a note that it seems to be close to *Bulliardi*. In his description of this latter he says "poris e pallido, rufescentibus." This phrasing would seem to imply that the colour-change is a gradual process in course of age and in drying and is not the usual formula he employs when describing a fungus that changes instantly on being wounded.

Now *rufescens* is one of the words not fully dealt with by either Canon du Port or Mr. Wharton in their excellent papers on colours of fungi as used by Fries, but we can scarcely recon-

cile such a coarse word with the lovely tint of this Trametes. *Rufescens* is a word not freely used in describing fungi: it does not form the specific name of a single British Agaric. Fries applies it to the pileus and stem of *Lactarius subdulcis*, the pileus of *L. circellatus*, the gills in age of *Hygrophorus ovinus* and the stem and gills of *Lactarius rufus*, but not to the pileus which he calls *badio-rufus*.

Rufescens really means becoming *rufus*, which is a yellowish-red, whereas *rubescens* is suggestive of blushing, as seen in *Amanita rubescens* and *Rhizopogon rubescens*.

Fries applies this latter word to the interior of the stem of *Inocybe pyriodora*, and he says of that peculiar-smelling fungus *Entoloma ameides* "totus fungus rubescit."

But it is doubtful whether in using these words he had any such fine colour-distinction in his mind as some people have tried to make out. In describing *Polyporus rufescens* he says it is *carneus*, and of *Boletus rubescens* "pileo rufescente, stipite carneque rufescentibus," whilst under the two species we are considering he adds a note that *T. rubescens* and *T. Bulliardi* are apparently close to each other, as each verges into "fulvum vel rufum." Now these are distinct colours again, *fulvus* being the tawny of a lion and *rufus* is the word he uses for the zone on the stem of *Cortinarius haematochelis*.

Dr. Quélet instals *Trametes rubescens* as the standard species with a most excellent description, his "incarnat rosé" exactly meeting the case, and it is clear that he has this fungus in his mind, but he includes *Bulliardi* as a synonym, which is disconcerting, and refers them both to a form of *Lenzites tricolor*. Perhaps this is a case of wrongly lumping as he certainly was guilty in the matter of *Pholiota aurea* and *Ph. spectabilis*.

We cannot but think that this fungus is a much sounder species than many that have found a place in our Flora, presenting as marked a colour-change on being wounded as *Boletus luridus*, *Inocybe Godeyi* or *Agaricus haemorrhoidarius*, and that if it is really *Trametes Bulliardi* then the description of this latter as given in our books is totally inadequate and must have been drawn up from dried specimens, as it entirely fails to convey the slightest idea to the novice of the marked characteristics of this fungus in the fresh condition.

On one previous occasion at least this *Trametes* would seem to have excited curiosity—it may also have been a Shropshire specimen—it was in 1881 that the late Wm. Phillips, of Shrewsbury, sent a fungus to the Rev. M. J. Berkeley, and we have Mr. Berkeley's reply to Mr. Phillips, in which he says "Your fungus is undoubtedly *T. rubescens*, but I have always considered it the same with *Daedalea confragosa*. Fries' description does not accord with Bulliard's figure or description. I found it once

abundantly at Apethorpe on willow. It is a rare species, Fries had seen dried specimens only."

So Mr. Berkeley adds to our difficulties yet another species. This *Daedalea confragosa* is a common species in Shropshire occurring on decaying Rowan-trees, &c., and seems sufficiently distinct from the two we are now considering.

It is a peculiarity of this Trametes that it will not cast spores. We have failed to obtain any casting from at least a dozen specimens, and Mr. Carleton Rea, to whom specimens were submitted, met with the same result. The few isolated spores that were met with appeared to be curved in shape, but it would not be safe to give any measurement from these.

NOTES ON BRITISH CLAVARIAE.

By A. D. Cotton, F.L.S., The Herbarium, Royal Botanic Gardens, Kew.

The following notes deal with the nomenclature of two species of *Clavaria*, viz., *C. inaequalis*, Müller, and *C. fistulosa*, Holmsk.

Before considering these it may however be mentioned that during the course of an investigation of this genus, special attention has been paid to the spore and its value as a diagnostic character. The result of such a study shows that many species are remarkably constant in the size and form of their spores, whilst others are characteristically variable. Further, that the recognition of the type of spore of a given species will, in some cases, be found useless as a character to separate the plant from other species externally similar, whereas in other cases it will be found of great service for this purpose.

Additional work is required, but it is clear that a more accurate knowledge of the spores of the Clavariae would be of value, especially to the systematist.

CLAVARIA INAEQUALIS, Müller (in Flora Danica).

In the opinion of the writer *C. dissipabilis*, Britz. must be regarded as a synonym of *C. inaequalis*.

Practically the only feature which has hitherto kept the two apart is the character of the spores, those of the former were stated to be subglobose and provided with spines, and those of the latter elliptical and smooth. That *C. inaequalis* possesses smooth elliptical spores is a statement however which cannot be supported by facts. There is no type specimen in existence, but the ideas of older writers as to the plant are unmistakable.

It seems therefore desirable that the question should be settled and the evidence brought to light.

The history of the two names may be given as follows, taking first that of :—

C. DISSIPABILIS. This was described by Britzelmayr in 1885 (Hymenomyceten aus Südbayern, p. 289, fig. 28). The spores are stated to be 4-6μ diam. and provided with spines of different lengths. The coloured figure given is not elaborate but it shows the habit of the plant.

In 1893 Massee (Grevillea xxii., p. 42) recorded *C. dissipabilis* for Britain from Yorkshire specimens sent by C. Crossland; since then it has been found commonly throughout the country. Together, however, with the appearance of *C. dissipabilis*, the smooth spored *C. inaequalis* ceased to be met with, and those plants which would have previously been named *C. inaequalis* were found on examination to be rough spored and hence referred to Britzelmayr's species.

C. INAEQUALIS. The original reference and figure is in Flora Danica 1780, tab. 836, fig. 1. A yellow or orange-yellow fungus is figured. The clubs, which are somewhat flattened and pointed, grow in groups of threes and fours. It is named "*Clavaria* inaequalis *caespitosa compressa, lutea, apice acuminata.*" Our ideas of *C. inaequalis* originate from this figure; there is no "type" specimen. In 1797 when Persoon brought together the different species of Clavaria, he included *C. inaequalis*, quoting Fl. Dan. and giving a diagnosis. From Persoon's time and onward *C. inaequalis* has been recognised and recorded as of frequent occurrence. The first reference to the character of the spores appears to be in 1882, in which year Karsten (Ryss. Finl. Skand. Hattsv. ii., p. 171) describes these bodies as elliptical, $10 \times 5\mu$. This statement has been accepted by later writers; consequently when a rough spored plant was found it was pronounced new.* Thus Britzelmayr formed his *C. dissipabilis* and Boudier and Patouillard founded their *C. similis* (now a generally admitted synonym of *C. dissipabilis*) stating that it had been previously confounded with *C. inaequalis* but differed chiefly in the character of the spores.

When, however, we come to examine specimens in Herbaria, a *C. inaequalis* with elliptical smooth spores can nowhere be found. In Berkeley's Herbarium at Kew, for instance, all the European specimens of *C. inaequalis* (it is unnecessary to consider those outside Europe) fall into *C. dissipabilis*, with the

* It is interesting to note that Saccardo gives an alternative type of spore for *C. inaequalis*, "elliptical $10\text{-}12 \times 5\frac{1}{2}\ \mu$" or "irregularly globose 8 μ." Unfortunately the former measurement has been usually accepted, whereas the latter is approximately correct. Quélet also in 1888 gives the spores as globose 7 μ, but does not mention spines.

exception of a few odd plants, which are obviously small tufts of *C. fusiformis*. There can be no doubt therefore that Berkeley's idea of *C. inaequalis* was the rough spored plant. Other specimens of the species in question in the Herbaria of Currey, Broom, Bloxam (in British Museum) and Cooke (at Kew), together with various Continental exsiccati prove to be rough spored. Not a single plant is to be found in the Kew or British Museum collections, which can be called *C. inaequalis*, with smooth elliptical spores $10 \times 5\mu$, nor has such a plant been observed in the material sent to the writer by correspondents during the past three or four years; all on the other hand are rough spored.* Finally, Karsten's own exsiccati, No. 439, referred to by him in the passage above quoted, does not show the character of spore he described, but on the contrary those of the globose roughened type.

It seems therefore certain, that the statement, spores elliptical $10 \times 5\mu$ was incorrect, and that the description of *C. dissipabilis* as a new species was the result of this erroneous impression.†

C. inaequalis Müller must therefore be described as a species possessing sharply warted or spiney, irregularly globose spores, 5-6μ diam. (excl. spines) and including *C. dissipabilis* Britz. and *C. similis* Boud. and Pat. as synonyms.

Clavaria fistulosa Holmsk.

For the benefit of members of the Society, notes may be here added drawing attention to observations on this species by F. von. Höhnel. His results are published in the Oesterreische Botanische Zeitschrift 1904, p. 425-427.

C. fistulosa, was described by Persoon in 1797 (Comm. de Fungi Clavaeformibus, p. 34), though the name had been previously employed by Holmskiold (Annalen der Botanik, xvii., 1796, p. 64; see also, Beata ruris otia 1799? vol. i., p. 15 with fig.).

In 1799 Sowerby described *C. Ardenia* in "English Fungi," tab. 215. There is no doubt that this is a synonym of *C. fistulosa*, as Schroeter, Quélet and others have assumed. Massee is also of the same opinion, and it was by an oversight that in 1892 he kept them apart (Brit. Fung. Flora, vol. i., p. 86 and 87).

Von Höhnel now adds *C. contorta* Holmsk as a further synonym. This plant, of which little has been hitherto known,

* A small plant with spores $7 \times 3\ \mu$ has been met with which is generally labelled in Herbaria *C. helvola*, Pers. Some writers have taken this plant for *C. inaequalis*, it cannot however for one moment be regarded as the *C. inaequalis* of Flora Danica.

† The spores of *C. argillacea* Fr. correspond to the measurement $10 \times 5\mu$. As this species has not infrequently been mistaken for *C. inaequalis*, we have here a possible explanation of the origin of the error.

he regards as a distorted and abnormal form of *C. fistulosa*. His reasons for so doing are:—(1) The measurements of the spores, 14-20 × 7-8μ, thus showing the same variation in length as in *C. fistulosa*; (2) the presence of latex tubes as in that plant; and (3), the growth of normal *C. fistulosa* from plants of *C. contorta*.

There seems to be no reason for assuming that Von Höhnel's "ganz typische" *C. contorta* was other than the genuine plant, nor for regarding his conclusions as other than correct. *C. Ardenia* and *C. contorta* would therefore be reduced as synonyms of *C. fistulosa*.

OZONIUM AURICOMUM LINK.

By Carleton Rea, B.C.L., M.A., &c.

In the British Mycological Transactions for the season 1901, vol. i., p. 181, Dr. C. B. Plowright favoured us with a paper in which he traced a connection between the occurrence of *Ozonium auricomum* Link growing round a flower pot containing a plant of Aspidistra and a growth of *Coprinus domesticus* Fr. which subsequently attracted his attention to the matter. Dr. Lucien Quélet in his Flore Mycologique de la France, published in 1888, at p. 48 makes both *Ozonium radians* Pers. and *auricomum* Link to be the mycelial condition of *Coprinus radians* (Desm.) Fr. In the autumn of last year my friend Mr. W. B. Allen sent me on some *Ozonium auricomum* for identification, and in my reply I requested him to look out and see if he could not find a *Coprinus* growing along with it. A few days afterwards he met me at Wyre Forest and he then brought some of the *Ozonium auricomum* covered with a mass of *Coprinus radians* (Desm.) Fr. So it seems clear that two different species of Coprini arise from these *Ozonium*-like bodies. Since writing the above note Mr. D. A. Boyd informed me that he had connected the *Ozonium* with *Coprinus micaceus* Bull., and our President (Mr. Arthur Lister) at the Epping Foray said that he had found it associated with *Coprinus similis* B. & Br., and *C. micaceus* in a vast growth on a thick log in front of his house at Leytonstone, but it was not nearly in such abundance as the brown velvet felt that preceded the growth of *C. similis*.

Entoloma pulvereum *Rea.*

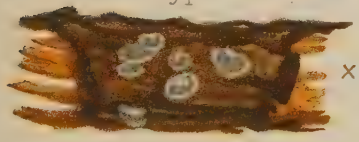
Collybia mephitica *Fr.*

Trans. Brit. Myc. Socy. Vol. II. Pl

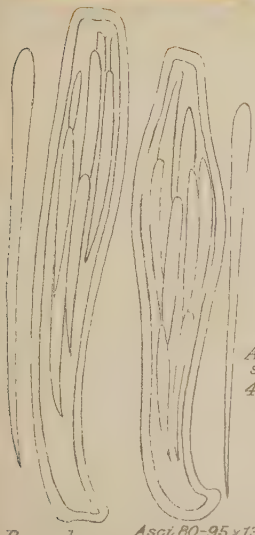
Orifice of pores.

×5-6 μ.

Polyporus leucomelas (Pers) Fr.



×



Ascus
110-120×11-12 μ.

ascospores
30-35×2-2·5 μ.

A few asco-spores
40×3-4 μ.

ascospores
60-70×3-4 μ.

Paraphyses
75-85×3 μ

Asci 80-95×13-15 μ.

Paraphyses 120-130×2 μ.

Cudonia confusa Br

Scleroderris bacillifera (Karst) Sacc.

West Norwood

Orifice of pores

x 3 μ.

Polyporus arcularius. (Batsch) Fr.

Orifice of pores.

4-5 x 3 μ.

Polyporus nodulosus Fr.

Orifice of pores.

Trametes rubescens (A & S) Fr.

E. A. Rea del.

West, Newman c

FUNGI NEW TO BRITAIN.

By Annie Lorrain Smith, F.L.S., and Carleton Rea, B.C.L., M.A., &c.

With Plates 14, 15 & 16.

Urophlyctis Alfalfae P. Magn. Ber. Deutsch. Bot. Ges. xx. (1902), p. 291, pl. xv.

Magnus has published a long account of the occurrence of this fungus, but without definite measurements. The resting spores are globose with a flattened side in which are several pores. They are contained in hollow chambers formed by the cells of the host plant.

On roots of Lucerne, Herne Bay. E. S. Salmon.

Gard. Chron. XXXIX. 1906, p. 122.

Ooospora lateritia Sacc. Malpighia XII., 1898, p. 218, pl. VIII., f. 15

Tufts cushion-like, scattered, sealing-wax red, 1-2mm. in diameter. Sterile hyphae creeping, septate, branched, 3-4μ thick, beset with small lateral outgrowths which bear the chains of conidia; Conidia globose cuboid, 4 × 3-4μ, dull reddish.

On decaying leaves, Luton. Mr. Saunders. March, 1906.

Oospora sulphurella Sacc. and Roum. Syll. IV. 21 (1886).

Tufts effused, velvety, light yellow; sterile hyphae creeping, fertile hyphae short, upright; conidia in chains, elliptical, 3-4 × 2μ.

On decaying bark. (Ardennes, Italy, Vienna.)

On Holly, Benthall, W. B. Allen, April 1906, and on Prunus spinosa near Perth, Mr. J. Menzies, February, 1907.

Acrostalagmus galeoides A. L. Sm. sp. n.

Tufts small, loose, white; vegetative hyphae branched septate; fertile hyphae erect, slender, the upper part with numerous branches arranged in whorls on the main stalk, branches 5 to 8 or more in a whorl, slender, 10-2μ in length, about 2-3μ wide at the base, tapering upwards and ending in a slight swelling, on which the spores are borne; spores numerous, forming a head, easily falling off, cylindrical, 4-6 × 1μ, colourless.

Collected at Epping Forest Foray by Mr. Hughes, on a decaying bracken.

Coniothyrium ribicolum P. Brun. Act. Soc. Linn. Bordeaux 1898, p. 14.

Perithecia globose, subglobose or globose-conical, black; spores subglobose or subovoid, sooty-brown, simple, rarely 1-2 guttulate, 3-4 × 2μ.

On dead branches of *Ribes nigrum.*

The specimens collected by Mr. Rea on the 7th of June, 1906, in the garden of The Manor House Farm, Sheriff's Lench, Worcestershire, were growing on the twigs of *Ribes Grossularia* and causing very great damage to the trees. The perithecia were developed below the epidermis, they are subglobose, more broad than deep, measuring about 140 × 80μ. The spores are rather elliptical, broad at the ends, 4-6 × 2μ. The differences from the type are too slight to justify the making of a new species.

Cudonia confusa Bres. Fung. Trid. vol. II., p. 67, pl. 179 and see pl. 15 hereof.

Pileus fleshy, convex, often depressed at the centre, rugulose, margin involute, viscid, soon dry, at first *pale cinnamon, then reddish brown or rufous*, 7-12 mm. broad, covered with distant, radiating folds underneath. Stem stuffed then hollow, *pulverulent*, round, at length compressed towards the base, of the same colour as the pileus but becoming fuscous at the base with age, 2-3 cm. long, 1-2 mm. thick. Asci spindle or club-shaped, stalked 110-120 × 11-12μ. Paraphyses thread-shaped, curved at the apex, 120-130 × 2μ. Ascospores crowded together, needle shaped, hyaline, multiguttulate, at length pseudo-septate, 30-35 × 2-2·5μ.

In a broken circle under beeches near Tsuga Canadensis, The Hermitage, Dunkeld, Perthshire, 25th September, 1906, Mr. C. McIntosh.

Easily distinguished from *Cudonia circinans* (Pers.) Fr. by the darker and more highly coloured pileus, the pulverulent stem which is generally sulcate in *circinans* and its smaller size.

Lachnea cinnabarina (Schw.) Mass. and Cross.

On dry muddy deposits from old dye tanks, Hebden Bridge, September, 1905. Crossland and Needham. Naturalist, Jan., 1906, p. 8.

Lachnea gilva (Boud.) Sacc. Syl.

On sandy ground, among moss, river side, Hebden Bridge, September, 1905. Crossland and Needham. Loc. cit. pp. 8 & 9

Scleroderris bacillifera (Karst.) Sacc.* Syll. Disc. p. 595, n. 2461. Tympanis bacillifera Karst. Symb. Myc. p. 253. Phragmospora bacillifera Mass. Rabh. Krypt. Flo. Disc. p. 340, and see pl. 15 hereof.

Ascophores erumpent, sessile or subsessile, solitary or often 2-5 springing up together, glabrous, black, at first closed and spherical, then expanded and concave, and at length almost plane, margin obtuse, disc shining, 5-6 mm. broad. Asci club-shaped, obtuse, slightly stalked, eight-spored 65-88 × 10-11 μ; spores crowded together, rod-shaped, generally attenuated at the ends, flexuous, simple or becoming 5-7 pseudo-septate, 20-52 × 3-4·5 μ; paraphyses filiform, slender, enlarged at the apex and becoming fuscous and joined together.

Spermogonia wartshaped, black, minute; spermatia oblong, simple, uncoloured 4 × 1·5 μ.

On dead branches of Abies excelsa, Dunkeld, Perthshire, 20th July, 1906, Mr. C. McIntosh.

The Asci in the Scotch gathering of this plant measured 80-95 × 13-15 μ, the paraphyses 75-85 × 3 μ and the ascospores 60-70 × 3-4 μ.

Lepiota Bucknalli B. & Br.

This species was first discovered at Clifton by Mr. Cedric Bucknall and it has since been recorded from Studley Royal, Yorkshire in 1881 (Tr. Y.N.U. IX. p. 211); Ledbury and Holme Lacy, Herefordshire (Fl. of Herefordshire 1889, p. 446); Potridings Wood and Kiveton Park, Yorkshire (Fung. Fl. of York, p. 24); at Wolverley, near Kidderminster, Worcestershire (Tr. Worces. Nats. Club, vol. III., p. 277); and in the neighbourhood of Grange Park, Hampshire (List of Fungi of Grange Park, Eyre, 1907).

Collybia mephitica Fr. Hym. Eur. p. 126, Fr. Mon. p. 172 and see pl. 14 hereof

Pileus fleshy, convex, subumbonate, 1·5-4 cm. broad, hygrophanous, greyish ochre becoming whitish, smooth, dry, *adpressedly and innately silky*. Stem 5-7 cm. long by 2-5 mm thick, *filiform*, equal, enlarged at the base, which is covered with the white mycelium, *obsoletely hollow, rigid, grey, pruinosely velvety with white flocci*. Flesh yellowish. Gills obtusely adnate, separating from the stem, attenuated in front, from 4-7 mm. broad, grey, crowded. Smell strong of new meal. Spores pruniform 7-8 × 4 μ, white.

* The identity of these specimens was kindly determined by Monsieur Emile Boudier.

Amongst Pine needles, Lawn Wood, Swarraton, Hampshire, 28th October, 1904. C.R.

Easily distinguished amongst the strong smelling species of Collybiae by the grey stem being everywhere covered with white flocci.

Chlorospora Eyrei Mass. (=Schulzeria Eyrei Mass. Grevillea vol. 22, p. 38, pl. 185.

This very distinct and interesting species was discovered by the Rev. W. L. W. Eyre at Alresford, Hampshire, in 1893, and he again found some specimens there in October, 1906. In 1901 it was recorded at the Fungus Foray of the Yorkshire Naturalists' Union from Potridings Wood, and on the 12th of October, 1906, Mr. E. W. Swanton gathered it on Heyshott Downs, Sussex.

Entoloma pulvereum Rea. See pl. 14 hereof.

Pileus 5-30 mm. broad, campanulate, then expanded and flattened, fuliginous, densely covered with *very minute scales*, which are erect at the centre, striate at first, margin very slightly incurved. Flesh thin fuliginous. Stem 25-50 mm. long, 2-3 mm. thick, stuffed at length hollow, equal, densely velvety and *covered when young with a reddish rust coloured meal* which becomes darker with age, externally and internally fuliginous. Gills adnate with a minute sinus, 2-5 mm. wide, grey at length dusted with the pinkish ferruginous spores, *veined*, somewhat distant, *exceeding the margin of the pileus*, edge irregular, thick, pale or pinkish at first, then deep rose colour. Spores pinkish ferruginous, irregular, angular, 12-13 × 6μ. Inodorous.

Amongst oak leaves under a holly tree. Preston Oak Hills, Hampshire, 13th October, 1905. Carleton Rea.

Easily distinguished amongst the Leptonidei group of Entolomata by the reddish rust coloured meal on the stem, the minute scales on the pileus which give it a farinaceous appearance and the veined gills exceeding the margin of the pileus. It should come next after *Entoloma griseocyaneum* Fr.

Coprinus tuberosus Quélet. Bull. Soc. Bot. France XXIV. (1877), p. 289, pl. 3.

On dung, Kew Gardens. The Wild Fauna and Flora of the Roy. Bot. Gardens, Kew, 1906, p. 128.

Hebeloma subsaponaceum Karst.

Allerthorpe Common, near Pocklington, Y.N.U. Excursion August, 1905. Massee and Crossland. Naturalist, January 1906, p. 7.

Cantharellus hypnorum Boud. Rév. Myc. 1892 p. 65.

Ferrymoor, near Cudworth. Y.N.U. Excursion, September 1905. E. Snelgrove. Naturalist, Jan. 1906, pp. 7-8.

Polyporus leucomelas (Pers.) Fr. Stev. Brit. Fun. p. 187. Mass. Brit. Fung. Fl. vol. I., p. 229, and see pl. 15 hereof.

The spores are white, hyaline, warted, spherical × 5-6μ.

This species has up to the present time only been recorded as British from Rothiemurchus Forest, where it was discovered by the Rev. Dr. Keith in 1876, and subsequently by Mr. Angus Grant in 1901 and 1906.

Polyporus arcularius (Batsch) Fr. Hym. Eur. p. 526. Syst. Myc. I p 342, and see pl. 16 hereof.

Pileus 1-3 cm. broad, pliant then coriaceous, somewhat umbilicate, zoneless, in the *first year covered with fuscous squamules*, in the second becoming glabrous and yellow *margin strigose.* Stem 10-25 mm. long 1-2 mm. thick, somewhat squamulose, greyish fuscous or bistre. Flesh white. Pores *oblong*, *rhomboidal*, thin, rather large, entire, whitish at length becoming fulvous. Spores round × 3μ, white.

On a dead twig, Faskally, near Pitlochry, Perthshire, 27th September, 1906. Mrs. Carleton Rea.

Easily distinguished from *Polyporus brumalis* Fr. by the shape of the pores, the strigose margin and fuscous squamules on the pileus.

Polyporus nodulosus Fr. Hym. Eur. p. 566, Ed. I. p. 474. Icon. t. 187, f. 2, and see pl. 16 hereof.

Pileus 1-3 cm. wide *triquetrous* and *nodular*, corky, woody, *not zoned*, *villous*, *rugose*, *rough*, fulvous then rust coloured. Flesh very hard, lighter in colour. Pores 1-5 mm. long, short, roundish, unequal, acutely torn, light cinnamon with a silvery sheen. Spores white, ellipsoid 4-5 × 3μ.

On a dead erect beech, south slope of Heyshott Down, near Midhurst, Sussex, October, 1906, Mr. E. W. Swanton.

Easily distinguished from *Polyporus radiatus* (Sow.) Fr. by the pores of the nodular pilei becoming confluent, by the absence of the brightly coloured margin of the pileus and by its habitat on beech.

Trametes rubescens (A. & S.) Fr. Hym. Eur. p. 584. Ed. I. p. 492. Alb. & Sch., p. 238, t. 11, f. 2, and see pl. 16 hereof.

White pruinose at first, *then reddening everywhere.* Pileus 5-10 cm. wide, 2-6 cm. deep, 1-2 cm. thick at the point of attach-

ment, semicircular, pubescent, at length becoming zoned towards the margin. Flesh corky, tough, light wood colour, then reddening. Pores 1-3 mm. long, linear, narrow, obtuse, sometimes round, white then blood coloured. Spores
Scentless.

On trunk of Salix Caprea hanging over a pool near Willey Hall, Salop, 12th August, 1906, Mr. W. B. Allen. For his distinctions see p. 161 hereof.

Hypochnus violeus Quél. Ass. Fr. 1882. Fl. Myc. p. 2.

Broadly effused, thin, byssoid. Hymenium rosy lilac with the circumference brighter coloured, minutely tomentoso-velvety. Spores elliptical $6 \times 4\mu$, white, hyaline.

On dead wood Swarraton Rectory, 27th December, 1903, the Rev. W. L. W. Eyre.

Lycoperdon cruciatum Rost.

On the ground among hazel bushes. Massee and Crossland. Naturalist, January, 1906, pp. 6 and 7, 3 figs.

OFFICERS FOR THE SEASON 1906.

President: Arthur Lister, F.R.S., Leytonstone, Essex, and Highcliff, Lyme Regis.

Vice-President: Professor H. Marshall Ward, D.Sc., F.R.S., F.L.S., &c., University Botanical Laboratory, Cambridge.

Hon. Secretary and Treasurer: Carleton Rea, B.C.L., M.A., &c., 34, Foregate Street, Worcester.

British Mycological Society.

LIST OF MEMBERS.

* Ordinary Members are denoted by an asterisk after the number.

Honorary Members.

1. Boudier, Monsieur Emile, 22, rue Grétry, Montmorency (Seine-et-Oise), France.

Foundation and Ordinary Members.

1. Acland, Sir Charles Thomas Dyke, Holnicote, Taunton, Somerset and Killerton, Exeter.
2. Adams, Mr. Alfred, M.A., M.B., Bridgend House, West Looe, Cornwall.
3.* Adams, Rev. D. C., Monks Risboro, Princes Risboro, and of Anstey, Coventry.
4. Allen, Mr. W. B., Benthall, Broseley, Salop.
5. Amphlett, Mrs. Eliza A. Dalehurst, 7, Bardwell Road, Oxford.
6. Balfour, Professor Isaac Bayley, M.A., M.D., F.R.S., Inverleith House, Edinburgh.
7. Barrington, Mr. F. J. F., Chapel Street, King's Lynn.
8. Biffen, Mr. R. H., M.A., The Gables, Histon, near Cambridge.
9. Bird, Mr. C. P., I.C.S. retired, J.P., F.R.H.S., Drybridge, Hereford.
10. Blackman, Mr. V. H., University College, London.
11. Boston, The Mycological Club, Boston, Mass., U.S.A.
12.* Butt, Rev. Walter, Kempsford Vicarage, Fairford.
13. Carr, Professor, J. W., M.A., University College, Nottingham.
14. Carruthers, Mr. J. B., B.A., Director of Agriculture and Government Botanist in the Federated Malay States.
15. Claridge, Miss M., 8, Park Terrace, Oxford.

16. Clarke, Rev. F. K., M.A., Orcheston, Malvern Wells.
17. Cooke, Dr. M. C., 53, Castle Road, Kentish Town, London, N.W.
18. Cotton, Mr. Arthur D., F.L.S., The Herbarium, Royal Gardens, Kew.
19. Crawford, Mr. W. C., M.A., F.R.S.E., 1, Lockharton Gardens, Edinburgh.
20. Crossland, Mr. Charles, F.L.S., 4, Coleridge Street, Halifax.
21. Edwards, Mr. W. H., Curator, Hastings Museum, Victoria Institute, Worcester.
22. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
23. Farmer, Professor J. Brentland, M.A., F.R.S., Botany Laboratory, Royal College of Science, S. Kensington, S.W.
24. Fitz-Gerald, Rev. H. P., F.L.S., Barracane, Wellington College, Berks.
25. Fowler, Rev. W., M.A., Liversedge Vicarage, Normanton.
26.* Fraser, Miss H. C. I., F.L.S., Royal Holloway College, Englefield Green, Surrey.
27.* Fry, Miss Agnes, Failand House, Failand, near Bristol.
28. Gardner, Mr. Frederic, 16, Stow Park Avenue, Newport, Monmouth.
29. Gelsthorp, Mr. Thomas, Eastgate, Louth.
30. Goodwin, Mr. D. P., Oakden, Kidderminster.
31. Grafton, Miss May, Plas Gwyn, Hereford.
32. Grant, Mr. Angus, Drumälan, Drumnadrochit, N.B.
33. Green, Mr. C. Theodore, M.R.C.S. England, L.R.C.P. London, F.L.S., 31, Shrewsbury Road, Birkenhead.
34. Hey, Mr. T., 8, Bloomfield Street, Derby.
35.* Holmes, Mr. Edward Morell, F.L.S., F.R.H.S., &c., Ruthven, Sevenoaks.
36. Hughes, Mr. G. C., Barton Lodge, Steeple Aston, Oxon.
37. Jenkin, Mr. Charles Frewen, 34, Ladbroke Square, London, W.
38. Johnson, Professor T., D.Sc., Science and Art Museum, Kildare Street, Dublin.
39. Lister, Mr. Arthur, F.R.S., Leytonstone and Highcliff, Lyme Regis.
40. Lister, Miss Gulielma, F.L.S., Leytonstone and Highcliff, Lyme Regis.
41. Macfie, Mr. John William Scott, B.A., Rowton Hall, Chester.
42. Mackenzie, Mr. D., 12, James Watt Street, Glasgow.
43. Miles, Miss Mary, L.L.A., Laurel Bank, Bridgend, Perth.
44. Missouri, The Botanical Garden, St. Louis, Ms. U.S.A.
45. Montague, Mrs. A., Penton, Crediton, N. Devon.

46.* Natorp, Mr. Gustav, 70, Ennismore Gardens, London, S.W.
47. Newcastle-upon-Tyne, The Literary and Philosophical Society.
48. New York Botanical Garden, Bronx Park, New York, U.S.A.
49.* Ogle, Mr. B. S., Hill House, Steeple Aston, Oxon.
50. Paul, Rev. David, L.L.D., 53, Fountainhall Street, Edinburgh.
51. Peacock, Dr. H. G., The Moors, Bishopsteignton, S. Devon.
52. Perceval, Mr. Cecil H. Spencer, Longwitton Hall, Morpeth.
53. Pipe, Mr. Charles, Broad Street, Worcester.
54 Plowright, Mr. Charles B., M.D., King's Lynn.
55. Plowright, Mr. Charles Tertius Maclean, B.A., M.B., King Street, King's Lynn.
56. Potter, Professor M. C., M.A, Durham College of Science, Newcastle-upon-Tyne.
57. Ramsay, Mr. A., 15, Lawn Crescent, Kew Gardens, S.O., Surrey.
58. Rayner, Mr. John Frederick, Ivy Bank, Highfield, Southampton.
59. Rea, Mr. Carleton, B.C.L., M.A., 34, Foregate Street, Worcester.
60. Rea, Mrs. Emma Amy, 34, Foregate Street, Worcester.
61. Renny, Mr. James, Chepstow House, Southfields, London, S.W.
62. Robinson, Mrs. E. M., St. Mary's Lane, Louth.
63. Rose, Mr. John, 34, Foregate Street, Worcester.
64.* Shadwell, Miss Blanche, F.L.S., Trewollack, Bodmin.
65.* Sharpe, Mr. C. J., 130, Fenchurch Street, London.
66. Slater, Mr. B., F.L.S., Yorkersgate, Malton.
67. Smith, Miss Annie Lorrain, F.L.S., 20, Talgarth Road, West Kensington, S.W.
68. Smith, Mr. Worthington G., 121, High Street, Dunstable.
69. Swanton, Mr. E. W., Brocton, Haslemere.
70. Tatum, Mr. E. J., Salisbury.
71. Trail, Professor James W. H., M.D., F.R.S., The University, Aberdeen, and 71, High Street, Old Aberdeen.
72. United States, Department of Agriculture.
73. Wager, Mr. Harold, F.L.S., Hendre, Horsforth Lane, Far Headingley, Leeds.
74. Watson, Dr. W., Deputy Surgeon General, University Club, Edinburgh.
75. Weiss, Professor F. E., Owen's College, Manchester.
76.* Welsford, Miss E. J., F.L.S., Royal Holloway College, Englefield Green, Surrey.
77. Woolhope, The Naturalists' Field Club, Hereford.

RULES.

Society's name and objects.

1. The Society shall be called "The British Mycological Society" and its objects shall be the study of Mycology in all its branches, systematic, morphological and pathological, the publication of annual reports recording all recent discoveries in any branch of mycology, and more especially giving a brief synopsis of the work of European Mycologists and the recent additions to the British Fungus Flora.

Members of Society.

2. The Society shall consist of Foundation Members, Honorary Members and Ordinary Members, the number of Foundation Members shall be limited to 100 and that of Honorary Members to 20, but the number of Ordinary Members shall be unlimited.

Foundation Members.

3. Foundation Members shall consist of those Members and Clubs who joined the Society previous to the limit of 100 Members of the Society having been attained, but after this number has been attained no Person or Club shall be admitted as a Foundation Member.

Honorary Members.

4. Honorary Members shall be Ladies or Gentlemen of pre-eminence in Mycology, or who have rendered special service to the Society.

Ordinary Members.

5. Ordinary Members shall be Ladies or Gentlemen elected as hereinafter set out.

Election of Members.

6. Until the limit of 100 Foundation Members be reached any person or Club may signify their desire of joining the British Mycological Society and will consequently be enrolled as Members thereof by the Secretary. Honorary Members shall only be elected

at a meeting of The British Mycological Society by the majority of the Members then present. Ordinary Members shall be elected either by the majority of the Members then present at the annual meeting, or meetings, or by the President, Vice-President, Treasurer, and Hon. Secretary at other times. All Ordinary Members shall be proposed and seconded respectively by existing Members, who shall sign a certificate (see appendix) in recommendation of him or her, one at least of the proposers so certifying from personal knowledge, and every candidate for election shall sign an undertaking to abide by the Rules if elected (see appendix).

Yearly Subscription.

7. All Ordinary Members and Clubs shall pay an annual subscription of 10/- and Foundation Members 5/-, and the same shall be due by the First of January in each year, whilst Honorary Members shall be exempt from any annual subscription. Any Member wishing to retire from the Society shall give notice to the Hon. Secretary in writing before 1st of December of the previous year, otherwise he shall be liable for the annual subscription for the next year.

Government of the Society.

8. The management of the British Mycological Society shall be vested in the President, Vice-President, Treasurer, and Hon. Secretary.

Election of Officers.

9. The President, Vice-President, Treasurer, and Hon. Secretary shall be elected annually, at the first meeting of the British Mycological Society in each year, by a majority of the Members then present.

Meetings or Forays.

10. The British Mycological Society shall hold one or more meetings annually at a place and time determined by the Members at the previous meeting, or in default thereof, by the President, Vice-President, Treasurer, and Secretary. Invitation from Local Societies shall be first entertained and the acceptance of such shall imply that the Local Society undertakes to arrange the excursions of the foray, obtain necessary permissions from landowners, and place at the disposal of the British Mycological

Society a room, free of cost, for the exhibition of specimens, delivery of addresses, and the transaction of business.

Accounts to be annually furnished and vouched.

11. At the first meeting of the British Mycological Society in each year the Hon. Secretary shall produce an account of the receipts and disbursements for the previous year duly vouched by the Hon. Treasurer, or if the two offices be combined, then by an independent Member of the Society.

Payment of Expenses.

12. At each Meeting the Members then present must pay to the Hon. Secretary their share of the expenses incurred.

Election of Chairman in absence of President and Vice-President.

13. In the absence of the President and Vice-President, the Members present at any meeting shall elect a Chairman for that Meeting.

Rarities to be recorded.

14. Members finding rare specimens, or specimens new to the British Fungus Flora, are requested to immediately communicate the fact to the Hon. Secretary, together with full descriptions, the locality, habitat, and the date thereof, and the Hon. Secretary shall report the same at the next meeting of the Society.

Every Member to have a copy of these Rules and any alteration thereof.

15. A printed copy of these Rules shall be sent to every Member of the Society on election, and to all Members on their alteration.

APPENDIX.

Form of proposal for Ordinary Membership of the British Mycological Society.

_____

of _____

being desirous of becoming an Ordinary Member of the British Mycological Society, we, the undersigned Members of the Society, certify that we consider h to be a desirable Member of the Society, and beg to recommend h for election.

Dated this day of 19

_____ (From personal knowledge).

Certificate to be signed by the Candidate.

I hereby certify that I desire to become an Ordinary Member of the British Mycological Society and that I will abide by the Rules if elected.

INDEX.

Abies excelsa, 169.
Acetabularia acetabulosa, 153.
Acremonium fimicolum, 32.
Acrospeira mirabilis, 7, 17, Pl. 2.
Acrostalagmus galeoides, 137, 141, 167.
Aegopodium Podagraria, 28.
Aethusa Cynapium, 27.
Agaricus arvensis, 7.
Elvensis, 137.
haematospermus, 154.
plumosus, 97.
versicolor, 64.
Allen, W. B., "A note on Trametes rubescens," 161.
Alnus, 66, 94, 99, 127.
catkins, 35.
Amanita adnata, 151.
aspera, 150.
cariosa, 13.
citrina, 37, 150.
excelsa, 150.
junquillea, 61, 151.
magnifica, 150.
megalodactyla, 150.
phalloides, 150.
porphyrea, 71.
rubescens, 150.
spissa, 137.
strobiliformis, 150.
verna, 150.
virosa, 69, 150.
Vittadinii, 71.
Amanitopsis adnata, 61.
vaginata, 30.
Ampullaria aurea, 60.
Angelica sylvestris, 28.
Anixiopsis stercoraria, 35.
Anthriscus sylvestris, 27.
Anthurus borealis, var. Klitzingii, 57, 58.
Apium graveolens, 28.
Apple leaves, 16.
Arachniotus candidus, 34.
citrinus, 34.
Arachnomyces nitidus, 35.
sulphureus, 35.
Armillaria aurantia, 151.
bulbigera, 41.
caligata, 13.
causetta, 13.
jasonis, 157.
mellea, 64.
robusta, 136.
rufa, 151.
subcava, 151.
Arthrobotrys superba, 33.
Arthroderma Curreyi, 61.
Ascodesmis Volutelloides, 34.
Aspergillus clavatus, 33.
niger, 33.
Badhamia decipiens, 99.
foliicola, 99.
populina, 99.
rubiginosa, var. globosa, 99.
Beech, 128, 171.
Beet-root tubers, 16.
Biffen, R. H., M.A. "Combating the fungoid diseases of plants," 103, 112.
Elected President, 70.
"Recent researches on parasitism," 70, 84.
"Some facts in the life history of Acrospeira mirabilis," 7, 17.
Birch, 8.
Boletus candicans, 101.
castaneus, 6, 103.
felleus, 101.
pachypus, 133.
parasiticus, 101, 133.
pruinatus, 43.
tenuipes, 71.

Botryosporium foecundissimum, 33.
Botrytis cinerea, 115.
pilulifera, 32.
Boudier Emile, elected first honorary member, 104.
Quelques rectifications et observations critiques sur les "illustrations of British Fungi" de Cooke, 150.
Bovistae, 160.
Bovistella, 160.
Brachycladium botryoides, 60.
Bracken, 167.
Brushwood, 99.
Bupleurum tenuissimum, 28.
Burrhel wild sheep dung, 36.
Calonectria vermispora, 93.
Calvatia, 160.
Camel dung, 34.
Cantharellus cupulatus, 136.
hypnorum, 171.
Cardboard among dung, 33.
Carum Bulbocastanum, 27.
Petroselinum, 27.
Cat dung, 32.
Cephalosporium succineum, 32.
Cercospora Melonis, 33.
Chaerophyllum temulentum, 194.
Chaetomium bostrychoides, 36.
crispatum, 36.
simile, 36.
Chaetostroma fimicolum, 34.
Chlorospora Eyrei, 170.
Choiromyces meandriformis, 103.
Chrysanthemum, 90, 91.
Chrysophlyctis endobiotica, 16, 31.
Cicuta virosa, 27.
Cintractia cingens, 6.
Circinella umbellata, 31.
Citrus, 66.
Clathrus cancellatus, 103.
Clavaria Ardenia, 41, 165, 166.
argillacea, 103, 105, 165.
contorta, 165, 166.
dissipabilis, 6, 163, 164, 165.
fistulosa, 163, 165, 166.
formosa, 105.
fragilis, var. gracilis, 5, 39.
fumosa, 43.
fusiformis, 165.
helvola, 165.
inaequalis, 163, 164, 165.
Krombholzii, 41.
Kunzei, 41.
luteo-alba, 41, 66, Pl. 3.
Michelii, 5, 39.
rufa, 5.
similis, 164, 165.
striata, 39.
stricta, 7.
subtilis, 5, 39.
tenerrima, 98.
Claviceps microcephala, 102.
Clitocybe elixa, 152.
flaccida, 152.
gilva, 152.
hirneola, 103.
infundibuliformis, 152.
inornata, 152.
inversa, 152.
lobata, 152.
pergamena, 104.
rivulosa, 152.
Sadleri, 152.
Cocoa-nut fibre, 38.
Collybia acervata, 152.
atrata, 103.
cirrhata, 14.
extuberans, 69, 101.
hariolorum, 43.
Henriettae, 62.
lacerata, 152.
mephitica, 169, Pl. 14.
planipes, 63.
platyphylla, 151.
pulla, 13, Pl. 1.
subelevata, 14, 63.
vertirugis, 43.
Conifer leaves, 127.
Coniothecium Questieri, 15.
Coniothyrium ribicolum, 168.
Conium maculatum, 28, 94.
Conopodium denudatum, 28.
Cooke, M. C., Agaric transformations, 29.
Recent British fungi, 13.
Coprinus aquatilis, 98.
Bresadolae, 38.
domesticus, 166.

Coprinus micaceus, 166.
radians, 166.
similis, 166.
squamosus, 70.
tuberosus, 170.
velox, 38.
Cordyceps ophioglossoides, 41, 69.
Cornus, 127.
Corticium chrysanthemi, 90, Pl. 6.
Cortinarius anfractus, 155.
armillatus, 69, 71, 105.
arvinaceus, 155.
balteatus, 8.
Berkeleyi, 156.
bicolor, 69.
bivelus, 133, 156.
bolaris, 101.
brunneofulvus, 155.
Bulliardi, 155.
caninus, 156.
causticus, 155.
collinitus, 155.
var. mucosus, 155.
cotoneus, 155.
cristallinus, 41, 105, 155.
decoloratus, 69.
elatior, 155, 156.
emollitus, 41.
erythrinus, 156.
evernius, 156.
glaucopus, 155.
herpeticus, 155.
impennis, 156.
infractus, 155.
laniger, 156.
mucifluus, 155.
mucosus, 155.
multiformis, 155.
orellanus, 101, 133, 155.
penicillatus, 155.
prasinus, 70, 155.
purpurascens, 155.
rigens, 102.
subferrugineus, 156.
sublanatus, 155.
talus, 155.
torvus, 156.
traganus, 69, 136.
Cortinarius triumphans, 7, 43, 105, 133.
unimodus, 156.
violaceo-fuscus, 97.
violaceus, 103, 155.
Coryne aquatica, 94.
Cotton, A. D., F.L.S., Notes on British Clavariae, 163.
Cow dung, 36.
Craterellus crispus, 105.
Ctenomyces serratus, 60.
Cucumber, 115.
leaves, 33.
Cudonia circinans, 168.
confusa, 168, Pl. 15.
Cyphella griseo-pallida, 66.
Daedalea confragosa, 136, 162, 163.
Daldinia concentrica, 8.
Dasyscypha calycina, 114.
laetior, 94.
Wilkommii, 114.
Decaying leaves, 60.
oak branch, 94.
polyporus, 93.
stump, 35.
Delitschia insignis, 36.
Dictydiaethalium plumbeum, 137, 141.
Didymocladium ternatum, 137, 141.
Dilophospora albida, 93.
Discula fagi, 128.
Dogs dung, 36.
Dung, 31, 32, 33, 34, 35, 36, 38, 92, 127.
Durella melanochlora, 94.
Eccilia atropuncta, 7, 70, 104.
carneogrisea, 43.
griseorubella, 43, 133.
Echinostelium minutum, 54.
Elaphomyces variegatus, 41, 69.
Elder, 66, 67.
Elm, 66.
Enerthenema elegans, 137, 141.
Entoloma clypeatum, 153.
clypeus, 153.
Cookei, 153.
Farrahi, 95.
frumentaceum, 153.

Entoloma liquescens, 153.
pulvereum, 136, 170, Pl. 14.
repandum, 153.
Saundersii, 8.
Epilobium hirsutum, 93.
Epping Forest Foray, 133.
Eyre, Rev. W. L. W., M.A.
Elected President, 6.
Mycology as an instrument of recreation, 43, 49.
Fir leaves, 93.
Flammula astragalina, 136.
decipiens, 5.
gummosa, 154.
gymnopodia, 154.
inopa, 133.
lenta, 154.
ochrochlora, 153, 154
sapinea, 154.
tricholoma, 97.
Flax wilt, 15.
Forays—
Epping Forest, 133.
Haslemere, 101.
Hereford, 5.
Savernake Forest, 41.
Whitby, 69.
Fowls dung, 32.
Fragaria leaves, 56.
Fraxinus dead branches of, 35.
Fuligo ochracea, 36.
Fungi, complete list of, gathered during the forays, 8, 44, 72 106, 137.
Fungi new to Britain, 31, 59, 92, 127, 167.
Furze leaves, 60.
Fusarium lini, 15.
Galera spicula, 38.
Geaster fimbriatus, 43.
rufescens, 5, 41.
umbilicatus, 66.
Geoglossum glabrum, 48, 104.
great numbers of, 43.
hirsutum, 48.
viscosum, 48.
Germinating seeds, 33, 60.
Giraffe dung, 33, 36.
Glaeosporium Bidgoodi, 15.
nervisequium, 56.
Tiliae, 43, 55, 60.
Gnomonia Needhami, 93.
Goats dung, 33.
Gonytrichum caesium, 56.
Graphium comatrichoides, 34.
Green, Dr. C. Theodore, F.L.S., "On Cintractia cingens," 6.
Gymnoascus setosus, 34.
Gymnosporangium Sabinae, 116.
Haplographium, 18.
chlorocephalum, 60.
Haslemere Foray, 101.
Hebeloma longicaudum, var. radicatum, 154.
subsaponaceum, 170.
Helicomyces scandens, 43, 60.
Helvella crispa, 133.
lacunosa, 105.
Heracleum Sphondylium, 27.
Hereford Foray, 5.
Herpotrichia nigra, 127.
Holly, 167, 170.
Horse dung, 33, 36, 38.
Hyacinth bulbs, 36, 60.
Hydnotrya Tulasnei, 101, Pl. 11.
Hydnum aurantiacum, 137.
ferrugineum, 137.
graveolens, 69.
imbricatum, 102, 137.
nigrum, 103.
nodulosum, 43.
scabrosum, 137.
zonatum, 103.
Hydrocotyle vulgaris, 27.
Hygrophorus agathosmus, 133.
bicolor, 38, 65.
calyptraeformis, 8, 43.
Clarkii, 65.
Clivalis, 8, 14.
foetens, 104.
fornicatus, 8.
fuscoalbus, 41.
Karstenii, 65.
latitabundus, 14, 65.
leporinus, 156.

Hygrophorus melizeus, 65.
metapodius, 41.
nemoreus, 156.
nitratus, 8.
subradiatus, var. lacmus, 7, 43.
turundus, var. mollis, 71.
unguinosus, 71.
Hypholoma cotoneum, 65, 155.
fasciculare, 152.
lacrymabundum, 65, 155.
pseudostorea, 65.
storea, 65.
var. caespitosa, 155.
Hypochnus violeus, 140, 172.
Hypoderma Desmazieri, 105, 128.
Ibex dung, 34, 36.
Inocybe, 152, 153.
Bongardii, 154.
brunnea, 43, 64, 71, Pl. 9.
Bucknalli, 96.
calamistrata, 69.
calospora, 95.
cervicolor, 96.
cincinnata, 154.
corydalina, 63, Pl. 4.
echinata, 154.
eutheles, 103.
fastigiata, 97.
fibrosa, 154.
fulvella, 64, Pl. 8.
Godeyi, 37, 71, 96, Pl. 8.
hystrix, 69.
incarnata, 154.
lanuginosa, 95.
maritima, 69.
mimica, 97.
mutica, 70.
obscura, 41, 101.
petiginosa, 107.
phaeocephala, 97.
praetervisa, 63, Pl. 5.
rhodiola, 101, 128.
rimosa, 133.
schista, 98.
tricholoma, 97.
violaceafusca, 97.
Irpex candidus, 131.
spathulatus, 137, 140.
Ithyphallus impudicus, 104.
Kangaroo dung, 34.
Lachnea cinnabarina, 168.
gilva, 168.
Lactarius capsicum, 43.
deliciosus, 66.
exsuccus, 156.
helvus, 101.
insulsus, 101.
mitissimus, 156.
sanguifluus, 66.
scrobiculatus, 5.
serifluus, 156.
spinosulus, 103, 129, 133, Pl. 11.
vietus, 133.
volemus, 156.
Lenzites tricolor, 162.
Lepidoderma tigrinum, 41.
Lepiota acutesquamosa, 41, 133.
amianthina, 157.
atrocrocea, 62.
Bucknalli, 169.
Brebissonii, 151.
carcharias, 151.
cepaestipes, 151.
clypeolaria, var. 151.
clypeolaria, var. alba, 37.
flos-sulfuris, 151.
granulosa, 151.
var. rufescens, 151.
haematosperma, 154.
hispida, 151.
lenticularis, 41, 101, 150.
lutea, 151.
metulaespora, 133.
Naucina, 151.
nigromarginata, 61.
rachodes, 137.
seminuda, 43.
serena, 151.
sistrata, 151.
Leptonia euchroa, 5.
solstitialis, 104.
Licea flexuosa, 43.
Lichens, 61.
Lime leaves, 55, 60.

Linaria vulgaris, 6.
Lindroth's classification of the Uredineae of the Umbelliferae, 7, 26.
Lister, Arthur, F.R.S., elected president, 102.
"On the occurrence of Echinostelium minutum De Bary, near Hereford," 54.
Presidental Address, 136, 142.
Llama dung, 34, 36.
Lucerne roots, 167.
Luzula sylvatica, 98.
Lycoperdon atropurpureum, 158, 159, 160.
bovista, 157, 159.
caelatum, 158, 159.
cepaeforme, 157, 158, 159.
Cookei, 159, 160.
cruciatum, 172.
depressum, 71, 98, 109, 137, 140, 158, 159, 160, Pl. 9.
echinatum, 6, 158, 159, 160.
excipuliforme, 135, 158, 160.
var. flavescens, 160.
favosum, 133.
gemmatum, 158.
Hoylei, 158, 159, 160.
hyemale, 160.
perlatum, 158, 159, 160.
pratense, 160.
pusillum, 157, 158, 159.
pyriforme, 158, 159, 160.
var. excipuliforme, 160.
var. tessellatum, 158.
saccatum, 158, 160.
spadiceum, 159.
umbrinum, 101, 158.
velatum, 39, 41, 43, 158, 160, Pl. 3.
Lysurus australiensis, 57, Pl. 3.
Macrodendrophoma salicicola, 127.
Magnusia nitida, 36.
Mangolds, 33.
Marasmius archyropus, 139.
var. suaveolens, 103, 129, Pl. 12.
candidus, 157.
erythropus, 152.
Hudsoni, 6, 71.
lagopinus, 98.
sclerotipes, 14.
urens, 6.
Vaillantii, 5.
Melanospora lagenaria, 93.
Members, list of, 1, 67, 70, 173.
Merulius confluens, 66.
Guillemoti, 5, 38.
molluscus, 43, 135.
Mitrophora semilibera, 69.
Molinia caerulea, 102.
Mollisia amenticola, 35.
Monilia candicans, 8, 12, 32.
Koningi, 32.
Mortierella pilulifera, var. parvispora, 71, 92.
Mosses, 99.
Mutinus caninus, 104.
sulcatus, 57.
Mycena cruenta, 70.
dissiliens, 71.
elegans, 43.
haematopa, 69, 71.
Iris, 70.
olivaceomarginata, 6, 138.
rorida, 43.
stylobates, 137, 138.
zephira, 43.
Mycetozoa, list of, 11, 12, 48, 75, 111, 141.
Myrrhis odorata, 27.
Myxotrichum aeruginosum, 34.
ochraceum, 34.
spinosus, 35.
Naucoria myosotis, 134, 138.
pusiola, 154.
scolecina, 43.
sobria, 69.
var. dispersa, 154.
Nectria coccinea, 71.
ditissima, 116.

Nolanea mammosa, 153.
papillata, 71, 95.
rhodospora, 63.
Odontoglossum, 15.
Oedocephalum clavatum, 60.
glomerulosum, 57.
ochraceum, 32.
Oedomyces leproides, 16, 103.
Officers, list of, 3, 67, 100, 131, 172.
Oligonema flavidum, 99.
furcatum, 99.
Ombrophila decolorans, 35.
Omphalia pseudo-androsacea, 152.
retosta, 5.
striaepilea, 135, 138.
Oospora lateritia, 167.
sulphurella, 167.
Oronge sucrée, 151.
Ostrich dung, 32.
Otidea aurantia, 105.
leporina, 103.
Owl castings, 35.
Ozonium auricomum, 136, 166.
radians, 166.

Panaeolus campanulatus, 155.
fimiputris, 155.
Paxillus atrotomentosus, 156.
giganteus, 8, 71.
involutus, 156.
leptopus, 156.
panuoides, 156.
porosus, 65.

Peaty ground, 94.
Peniophora chrysanthemi, 90, Pl. 6.

Perceval C. H. Spencer, "Notes on three uncommon fungi," 91.

Perichaena variabilis var. pedata, 99.
Peridermium pini, 69.
Peziza recedens, 94.
Phallus imperialis, 59.
Phellomyces sclerotiophorus, 59.
Pholiota adiposa, 41, 43.
aegerita, 153, 154.
aurea, 41, 153.
caperata, 153.
capistrata, 154.
Cookei, 154.
flammans, 133, 136.
grandis, 37.
marginata, 154.
mycenoides, 154.
pudica, 153.
squarrosa, var. verrucu-losa, 154.
terrigena, 153.
togularis, 154.
tuberculosa, 154.
unicolor, 154.

Phoma caulographa, 94.
pinastri, 122.

Physalospora gregaria, 127.
Physarum leucopus, 137, 141.
Pigeon dung, 33.
Pilacre faginea, 41.
Pimpinella Saxifraga, 27.
Pinus sylvestris, 122, 128.
Pistillaria pusilla, 98.
Plane leaves, 56.
Pleurotus acerinus, 101.
applicatus, 8.
corticatus, 91.
decorus, 101, 128, Pl. 10.
ostreatus, 152.
var. euosmus, 153.
rufipes, 63.
sapidus, 152, 153.
septicus, 135.
serotinus, 91.
subpalmatus, 153.
ulmarius, 152.

Plowright, C. B., M.D., "Corticium (Peniophora) Chrysanthemi," 90.

"Eriksson's recent researches on the vegetative life of the cereal rust-fungi," 71, 76.

"Lindroth's classification of the Uredineae of the Umbelliferae," 7, 26.

"On Mushrooms and Toadstools," 104.

Pluteolus aleuriatus, 135.

Pluteus ephebius, 153.
hispidulus, 135, 138.
nanus, 71.
phlebophorus, var. reticulatus, 153.
roseoalbus, 153.
salicinus, 70.
semibulbosus, 153.
umbrosus, 6.
Polygonum bistorta, 28.
Polyporus arcularius, 171, Pl. 16.
benzoinus, 103, 130, Pl. 12.
cuticularis, 10, 135.
leucomelas, 136, 171, Pl. 15.
nodulosus, 171, Pl. 16.
radiatus, 171.
rufescens, 69, 135.
Schweinitzii, 102.
squamosus, 105.
Polystictus Montagnei, 101, 130, Pl. 11.
Populus, 99.
Poria obliqua, 66, 131.
Potato tubers, 16, 59.
Presidents—
Biffen, R. H., M.A., 70.
Eyre, W. L. W., M.A., 6.
Lister, Arthur, F.R.S., 102.
Smith, A. Lorrain, F.L.S., 134.
Smith, Worthington G., F.L.S. 42.
Prunus, 127, 167.
Psalliota augusta, 154.
campestris, var. villatica, 154.
cretacea, 151.
Psathyrella disseminata, 155.
prona, 155.
Psilocybe semilanceata, 30.
var. caerulescens, 155.
Pteris aquilina, 36.
Puccinia Aegopodii, 28.
Angelicae, 28.
Apii, 28.
bulbocastani, 27.
bullata, 28.
Bupleuri-falcati, 28.
Chaerophylli, 27.
Puccinia Cicutae, 27.
Conii, 28.
Conopodii, 28.
Heraclei, 27.
Hydrocotyles, 27, 135.
Petroselini, 27.
Pimpinellae, 27.
Saniculae, 28.
Smyrnii-olusatri, 27.
tumida, 28.
Pythium De Barryanum, 115.
ultimum, 31.
Rabbit dung, 31, 32, 33, 34, 92, 127.
Rasberry, 93, 94.
Rat dung, 35.
Rayner, J. F., "Mycology as a branch of nature study," 104, 123.
Resticularia Boodlei, 60.
nodosa, 59.
Rea, Carleton, B.C.L., M.A., &c., "A very abnormal form of Agaricus arvensis," 7.
Epping Forest report, 133.
Fungi new to Britain, 31, 59, 92, 127, 167.
Haslemere Foray report, 101.
Hereford Foray Report, 5.
"How to distinguish the species of British Lycoperda in the field," 157.
"Notes on two Phalloideae new to Europe," 43, 57.
"Ozonium auricomum Link," 166.
Savernake Forest Foray report, 41.
Whitby Foray Report, 69.
Red Deer dung, 32.
Rhinotrichum Thwaitesii, 57.
Rhizina inflata, 133.
undulata, 101.
Rhizoctonia violacea, 33.
Rhizopogon luteolus, 133.
Rhopographium pteridis, 104.
Ribes Grossularia, 168.
nigrum, 168.
Robinia, 66.
Roe dung, 34.

Rosellinia clavariae, 7.
Rotten plank, 99.
Rufescens, meaning of, 161, 162.
Rules, 176.
Russula adusta, 156.
atropurpurea, 29, 156.
azurea, 133.
chloroides, 101.
cyanoxantha, 156.
delica, 156.
densifolia, 69, 156.
depallens, 156.
foetens, 29.
fusca, 156.
heterophylla, 157.
lepida, 156.
ochroleuca, 156.
olivascens, 157.
rubra, 29.
var. sapida, 29, 156.
sardonia, 156.
vesca, 156.
xerampelina, 156.
Saccardo "De diagnostica et nomenclatura mycologica," 70, 80.
Salix, 127, 128.
Sanicula europaea, 28.
Savernake Forest Foray, 41.
Schulzeria Eyrei, 170.
grangei, 37, Pl. 5.
lycoperdoides, 13.
Scleroderris bacillifera, 136, 167, Pl. 15.
fagi, 134, 141.
Sclerotinia Fuckeliana, 35.
Secretary, 6, 42, 70, 102, 134.
Sepedonium nivium, 32.
Septoria fragariae, 56.
Sheep's dung, 32.
Silaus flavescens, 28.
Smith, A. Lorrain, F.L.S.,
"Diseases of plants due to fungi," 55
elected president, 134.
"Fungi new to Britain," 31, 59, 92, 127, 167.
"Note on Sphaeropsis pinastri," 122.
"Notes on a species of Stilbum," 7.
Smith, A. Lorrain, F.L.S.,
"Notes on fungi recently collected," 66.
Smyrnium Olusatrum, 27.
Sordaria bombardioides, 36.
pusilla, 127.
Sparassis crispa, 41, 102, Pl. 13.
laminosa, 102, 131, Pl. 13.
Sphacelotheca hydropiperis, 137, 140.
Sphaeospora citrina, 94.
Sphaerobolus dentatus, 67.
Sphaeropsis Ellisii, 122.
pinastri, 122.
Sphaerotheca castagnei, 119.
pannosa, 119.
Sporodesmium piriforme, 34.
Stemonitis fusca, var. confluens, 41.
Stereum multizonatum, 101.
quercinum, 39.
Stevenson, Rev. J., L.L.D., 70.
Stictis sulfurea, 93.
Stilbum, 7, 25.
ovalisporum, 26.
Stropharia caput-Medusae, 8, 155.
coronilla, 154.
cotonea, 155.
melasperma, var. lutescens, 154.
squamulosa, 101.
Stysanus fimetarius, 8, 34.
Symphosira parasitica, 94.
Syncephalis intermedia, 31.
Tetradia salicicola, 127.
Thelephora terrestris, 137.
Tichothecium pygmaeum, 61.
Tolypothrix, 60.
Trail, Professor W. H., M.D., F.R.S., "Distributional Records," 5.
Trametes Bulliardi, 41, 101, 136, 161, 162.
cinnabarina, 5.
mollis, 41.
rubescens, 135, 136, 161, 162, Pl. 16.
Treasurer, 6, 42, 70, 102, 134.

Tremella indecorata, 137, 140, 171.
Tremellodon gelatinosum, 41, 43, 101.
Trichia lutescens, 99.
Trichocladium asperum, 33.
Tricholoma acerbum, 151.
albellum, 152.
album, 152.
bufonium, 133.
cartilagineum, 152.
equestre, 136, 151.
flavo-brunneum, 151.
frumentaceum, 153.
horribile, 79, 94, Pl. 7.
humile, 152.
var. blandum, 152.
imbricatum, 151.
lascivum, 152.
melaleucum, 133, 152.
militare, 136.
nudum, 152.
var. major, 152.
personatum, 152.
pessundatum, 136.
portentosum, 151, 152.
sordidum, 152.
squarrulosum, 62, Pl. 4.
stans, 151.
terreum, 151, 152.
tumidum, 152.
vaccinum, 151.
Trichosporium insigne, 33.
Tricothecium inaequale, 33.
Tubaria crobula, 6.
Ulocolla foliacea, 103.
Uncinula spiralis, 119.
Ural wild sheep dung, 34.
Uromyces pisi, 116.
Urophlyctis Alfalfae, 167.
Valsa heteracantha, 61.
Venturia Thwaitesii, 93.
Vice-Presidents—
Lister, A., F.R.S., 134.
Ward, H. Marshall, D.Sc., F.R.S., 6, 42, 70, 102.
Vine leaves, 35.
Volvaria volvacea, 136.
Ward, H. Marshall, D.Sc., F.R.S., &c., 134.
Watson, Dr. W., 69.
Whitby Foray, 69.
Wild-bees' nest, 34, 35.

ERRATA AND CORRIGENDA.

p. 8. l. 7 from top for fornicatus read clivalis.

10. 2 from top for fornicatus read clivalis.

30. 10 from bottom for semi-lanceatus read semi-lanceata.

41. 17 from top for lateritia read Godeyi.

59. 22 from top for d'eglise read de réglisse.

69. 16 from bottom for haem-atopus read haem-atopa.

71. 4 from top for haematopus read haematopa.

72. 20 from top for haematopus read haematopa.

Published 15th June, 1907.